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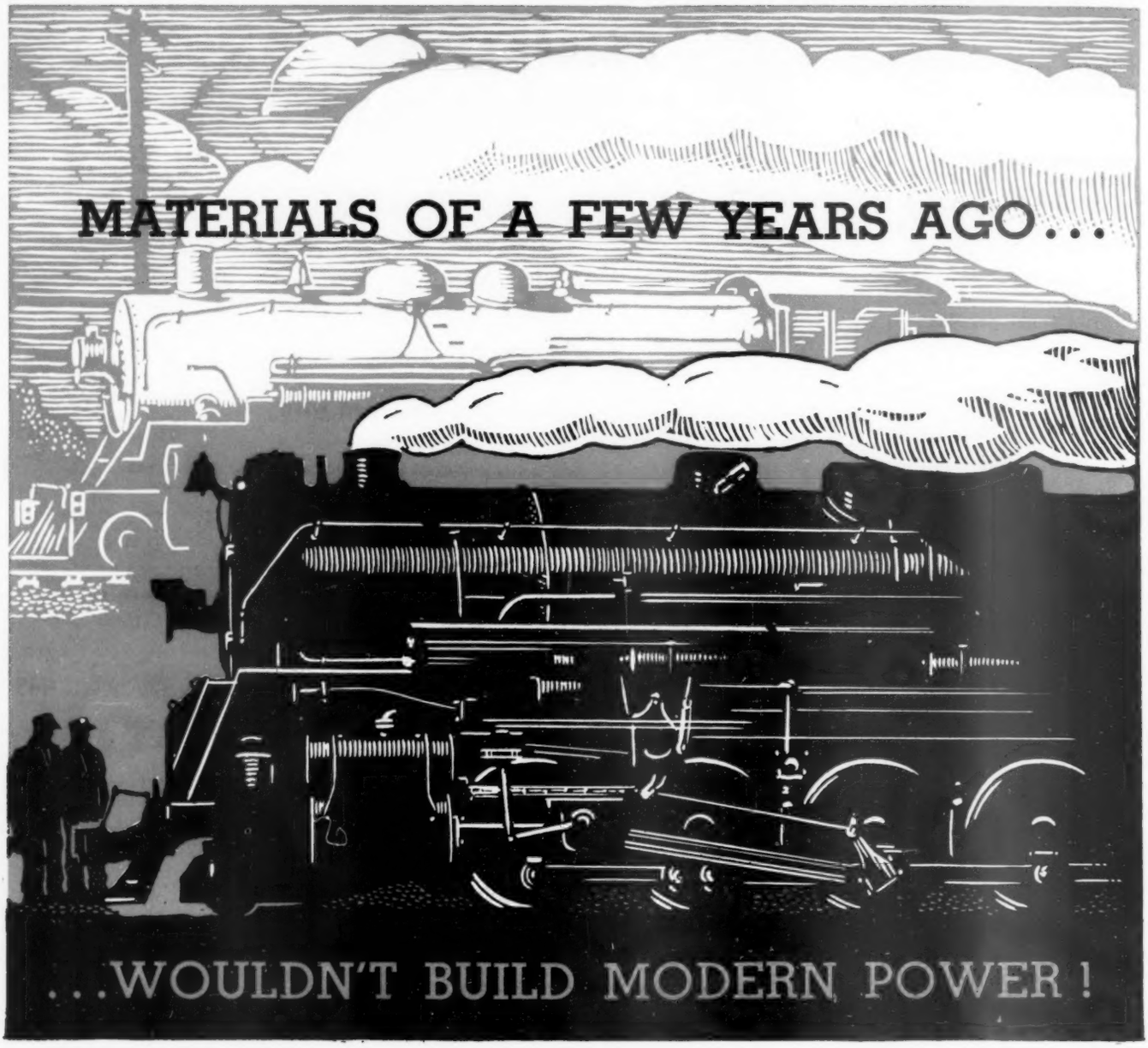

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RAILWAY AGE

Spending, Taxing and the Railways

Every citizen's political affiliations and vote should be determined by all the policies favored and opposed by the different parties and their candidates, and not merely by those immediately, and perhaps only temporarily, affecting his own industry, business or job. But the kind of policies adopted or favored affecting his own industry, business or job are quite likely to be illuminating as respects the probable fairness and wisdom of the policies as a whole adopted or favored by those who seek his vote.

The threat of inflation—the result of the New Deal's unbalanced budget—and the disaster it would bring to all who work for wages on the railroads was discussed in these pages in our August 8 issue. The claim of taxation against the railroad man's income—30 per cent of it—was set forth in the issue of August 1. These New Deal obstacles to "green pastures" for railroad men are bad enough to be sure, and ought to cause them at least to ponder a while. But even more striking, and more directly threatening to railway workers, has been the fantastic length to which the New Deal has gone to subsidize the competitors of the railways.

In the 1932 campaign President Roosevelt gave evidence of understanding the transportation situation. He showed his appreciation of the unfair handicaps under which the railroads labor by citing, in his famous Salt Lake City speech, the free rights-of-way enjoyed by their competitors by highway and water and their lack of regulation. Shortly after his inauguration he proposed, tentatively, the levying of a tax on river and harbor vessels to cover the costs of waterway improvements. Such proposals were economically sound, and, if they had been carried out, would have corrected many of the inequalities in transportation created by the Old Deal. But nothing of the kind has been done. Excepting for passage of the Motor Carrier Act, competitive conditions have been made worse for railways and their employees under the New Deal.

Increased Expenditure for Railway Competitors

In the accompanying table are shown federal highway and waterway appropriations from 1929 down to date. The totals of the former unfortunately include some sums expended for flood relief damage, but they are sufficient to show the profligacy with which the New Deal has spent the taxpayers' money to strengthen the competitive position of the railways' rivals, and thus help them take traffic from the railways and throw railway employees out of work.

Federal expenditures for waterways and highways under President Hoover were excessive and indefensible and were then criticised as such in these columns. They constituted an unprecedented and growing subsidization of transportation for which there was no economic justification—a typical example of Old Deal favoritism of special interests. But along comes the New Deal and in the last fiscal year boosts waterway appropriations from the Hoover average of $120,714,587 to a new high of $363,864,732, an increase of 201 per cent. And the Hoover average of $122,975,817 for federal aid to highways is advanced to $625,000,000 for the current fiscal year, an increase of 408 per cent.

Federal Appropriations for Waterway and Highway Transportation in the United States, Years 1929 to 1936

Fiscal year in which appropriations became available	Appropriations for rivers, harbors and flood control *a*	Appropriations for Federal-aid highways & flood relief damage *b*
1929	$ 93,158,877	$ 80,197,294
1930	111,818,906	78,654,000
1931	130,331,377	208,051,936
1932	147,549,187	125,000,000
1933	58,860,173	245,000,000
1934	308,829,962	400,000,000
1935	363,864,732	143,143,175
1936	*	*c*625,000,000

* Not yet available.

a From annual reports of the Chief of Engineers, U. S. Army—Part 1. Figures exclude appropriations for construction of Dam No. 2, Tennessee River, Ala., and for operating and care of hydroelectrical development.

b From annual reports of the United States Department of Agriculture, Bureau of Public Roads. Figures exclude appropriations for highways in National parks, forests, public lands, Federal reservations, etc.

c Includes $500,000,000 actually allocated according to provisions of Emergency Relief Appropriation Act of 1935. The act authorizes the allocation of not to exceed $800,000,000 for highways, roads, streets, and grade crossing elimination.

Certainly, pledged to economy in government, Governor Landon, if elected, would find such gigantic appropriations one place where he could not consistently avoid making sweeping reductions.

Favorable wage rates and working conditions do not mean anything if there is too little railroad traffic moving to give employment at these high wages. And how can railroads hope to provide normal employment when they have to charge rates which must cover all the costs of the service while the New Deal passes out almost a billion dollars in a single year toward making highway and water carriage cheaper to shippers? While greatly increasing government expenditures upon facilities used by the railways' competitors, the New Deal has done nothing to require those using

these publicly-owned facilities for commercial transportation to pay adequately and fairly for their use.

New Deal Railway Tax Increases

Turn to another way in which New Deal policies are affecting the railways. The Interstate Commerce Commission reports that in the first seven months of 1935 the railways earned a net operating income of $221,696,000, and in the first seven months of 1936 a net operating income of $300,020,000, an increase of 35 per cent. Footnotes in the commission's report, however, call attention to some significant facts. One shows a *credit* to the net operating income of the first seven months of 1935 of $6,458,128 because of charges to expenses previously made on account of the Railroad Retirement Act of 1934, which was held unconstitutional by the Supreme Court. Another footnote shows the inclusion in the report for the first seven months of 1936 of $10,124,808 for taxes under the Social Security Act, and of $19,607,340 on account of the excise tax act passed to provide retirement pensions to replace those the requirement of which by the Retirement Act of 1934 was held unconstitutional.

Subtract the *credit* mentioned from net operating income in the first seven months of 1935, and it is reduced to $215,237,670 as the amount actually earned. Subtract from *tax accruals* in the first seven months of 1936 the amounts accrued on account of the Social Security Act and the railroad retirement excise tax, and the amount of net operating income reported for the first seven months of 1936 would have been $329,751,204. In other words, in the absence of the credits and debits made necessary by this New Deal legislation to increase the tax burden of the railways, the net operating income would have shown an increase in the first seven months of 1936 over the first seven months of 1935 of about $115,000,000, or 53 per cent, instead of the increase reported of only about $78,000,000, or 35 per cent. This improvement in financial results due to efficient management would have been shown in spite of full restoration of the pre-depression wage scales.

The fairness and wisdom of adding the Social Security tax to the railroads and other industries at a time when they were struggling up out of the worst depression in history and trying to increase their own employment, and to increase their buying from other industries, which also would have increased employment, is certainly very questionable. The passage in addition of special legislation applicable to the railroads alone to increase their taxes at present in order to provide for pensions in the future is far more questionable.

Taxes that Hinder Employment

It is contended that this is in the interest of labor and especially of railway labor. But the railways are still employing 635,000 less persons than in 1929 and buying only about one-half as much as then from the manufacturing industry. They cannot pay out for increased employment or buying the money they must accrue for increased taxes. If decisions of the Supreme Court should relieve them from the necessity of paying these added taxes they would increase in the same measure the ability of the railways directly and indirectly to increase employment immediately. Under present and immediately prospective conditions is it more desirable to prevent employment now in order to provide for pensions in future, or to provide employment and stimulate buying now, and thus so promote recovery as to make business better able to pay pensions in future?

The railways are recovering because of the natural revival of general business that follows every depression and because of economy in management that is increasing their net operating income in spite of artificial government-made hindrances and burdens. They would be recovering, increasing the number of their own employees and increasing employment in the other industries by their buying from them much faster but for these government-made hindrances and burdens.

Huge expenditures to aid their competitors; increased taxes; certainty of further greatly increased taxes or dangerous inflation unless government spending is drastically reduced; interference with increase in employment—these are not things for which railways or their employees can intelligently be thankful to anybody.

Transportation by Taxation

There are but two of our five great transport agencies that rely upon private capital from the ground up, just as you do in your business. They are railways and pipelines. Waterways, highways, and airways are agencies that have been aptly described recently as "transportation by taxation."

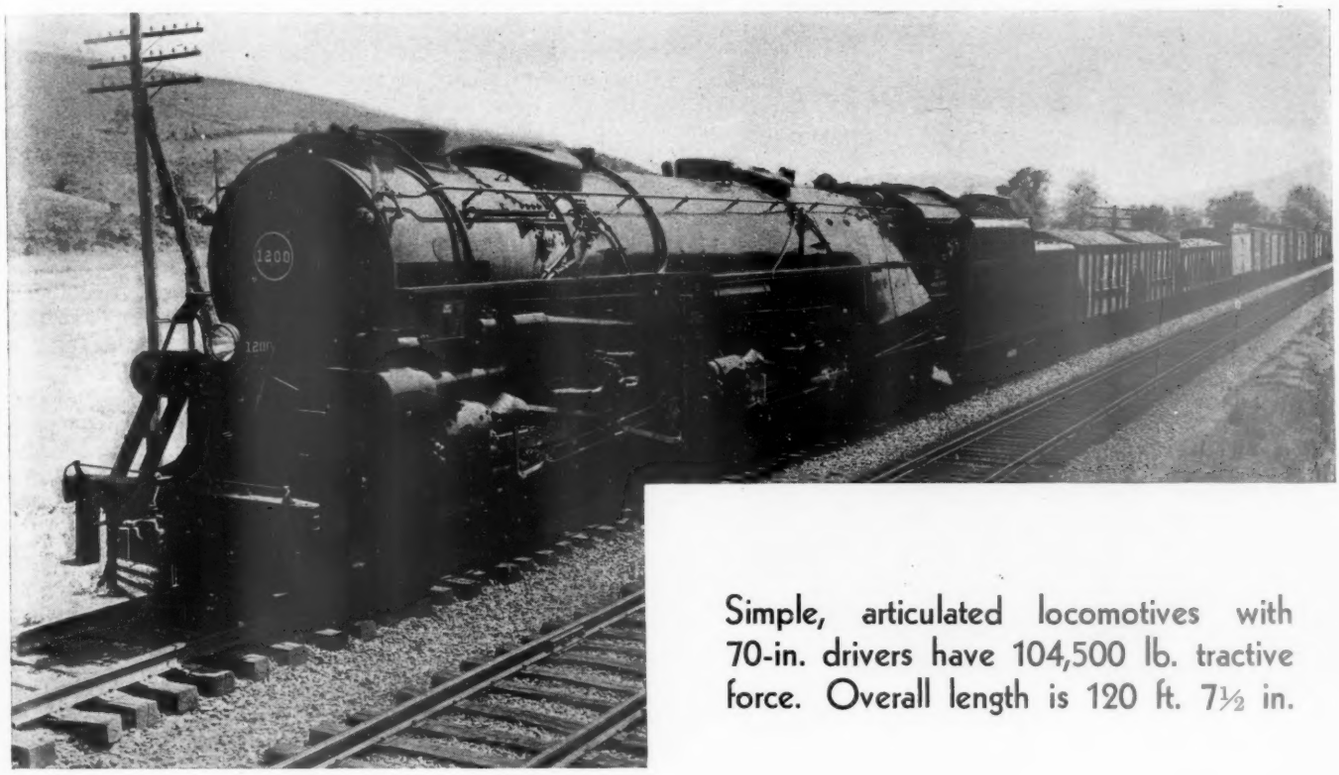
This is not altogether a matter of money subsidy, though that element is there, what I have in mind rather is that they have been promoted, extended, sustained by a government agency, in disregard of public need, of effect upon existing agencies or even upon each other, of duplication in investment, in capacity, in service.

The end of this transportation by taxation is not in sight. General Markham, chief of Army Corps of Engineers, stated publicly in 1934 that they had on the calendar 160 additional projects which would entail a capital cost of 8 billion dollars. The aviation industry wants 120 millions out of the public treasury for certain little additions it would like to have made. There has been some talk of great transcontinental highways.

It is all to be based upon government credit. Why? Because, so far as the great fixed investment in the improved highway, in the improved waterway, in the airway is concerned, private credit for highways has been as dead as the famed dodo since turn-pike days, for waterways since they were pensioned in dotage, the last toll being removed in 1882, and for airways never did exist. This is transportation by taxation.

Dr. C. S. Duncan in an address before the New England Shippers' Advisory Board

Norfolk & Western Locomotives Equipped with Roller Bearings



Simple, articulated locomotives with 70-in. drivers have 104,500 lb. tractive force. Overall length is 120 ft. 7½ in.

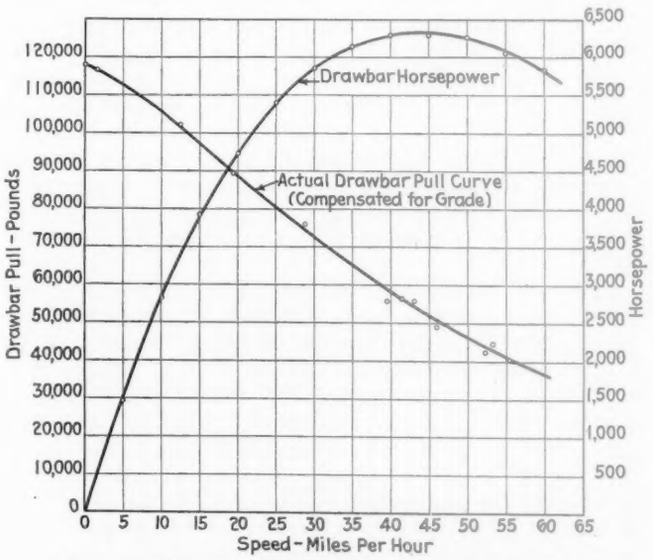
THE Norfolk & Western during May and June of this year completed at its Roanoke, Va., shops two unusually large simple articulated locomotives which were designed for speeds of 60 to 65 m.p.h. in time-freight service. Road tests which have been made with this new motive power indicate its ability to handle 4,800 tons on a 0.5 per cent grade at 25 m.p.h. On a comparatively level tangent this locomotive attained a speed of 64 m.p.h. with a 7,500-ton train. The chart accompanying this article shows the drawbar pull and drawbar horsepower curves plotted from dynamometer tests taken while the locomotive was handling a merchandise train where the tonnage was relatively low and the speed high. It is interesting to note that the curve shows drawbar horsepower (this curve has reference to performance on level track) over 6,000 at speeds from 32 to 57 m.p.h., with a maximum of 6,300 at a speed of 45 m.p.h.

The total weight of the engine and tender is 948,600 lb. and the total engine and tender wheel base is 108 ft. 7¼ in.

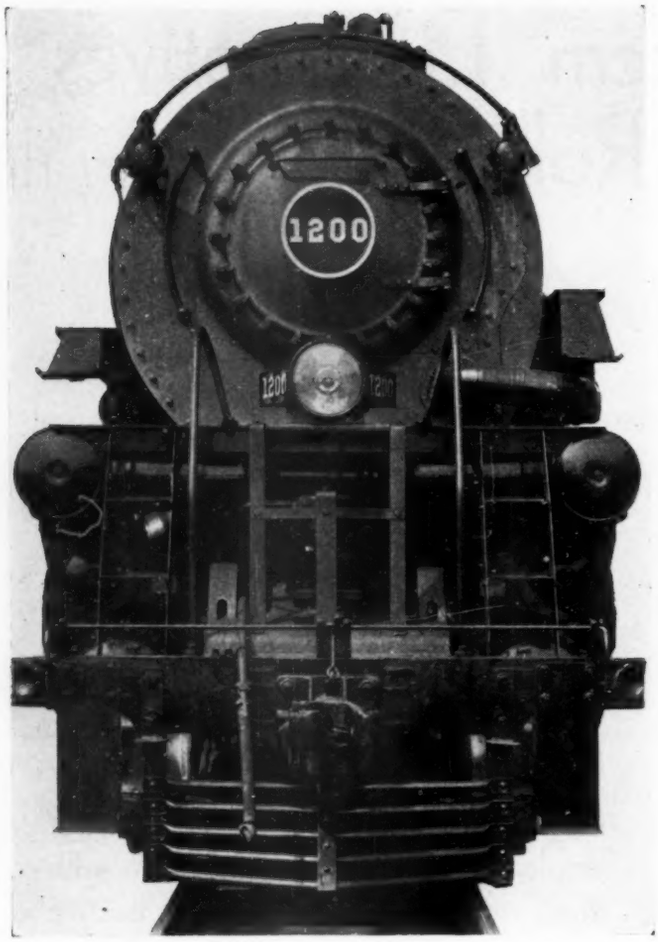
The Boiler

The boilers are of particular interest because of their size. With an overall length of 60 ft. 9 3/16 in. and a light weight of 148,500 lb. they are the longest and heaviest boilers that have been built to date for any N. & W. locomotives. The barrels are constructed in four courses ranging in diameter from 91 in. inside diameter at the first course to 105½ in. outside diameter at the fourth course. The two front courses have 1⅛-in. thick carbon steel sheets and the third and fourth courses have 1-in. and ¾-in. sheets of nickel steel. The roof sheet is ¾-in. nickel steel.

The firebox is electrically welded throughout. The grate has a length of 13 ft. 10 in. and a width of 8 ft. 10¼ in. with a grate area of 122 sq. ft. The combustion chamber is 9 ft. 8 in. long. The boiler has 239



Curves Showing Drawbar Pull and Drawbar Horsepower at Speeds Up to 60 M. P. H.



Front End of One of the Norfolk & Western Locomotives

3½-in. diameter superheater flues and 57 2¼-in. diameter tubes. The length of the flues is 24 ft. 1 in. The construction of each boiler involved 2,970 rivets and 4,925 staybolts. The boiler holds 8,100 gallons of water at the working height and 9,835 gallons when full. The boiler expands in length 1 5/16 in. from cold to 330 lb. test pressure.

The boilers are designed for a working pressure of 300 lb. per sq. in., but safety valves are set to work at 275 lb. The grates used are of the N. & W. standard design and coal is fed by a Standard Type MB stoker. The firebox is equipped with a Security brick arch having five 3½-in. arch tubes.

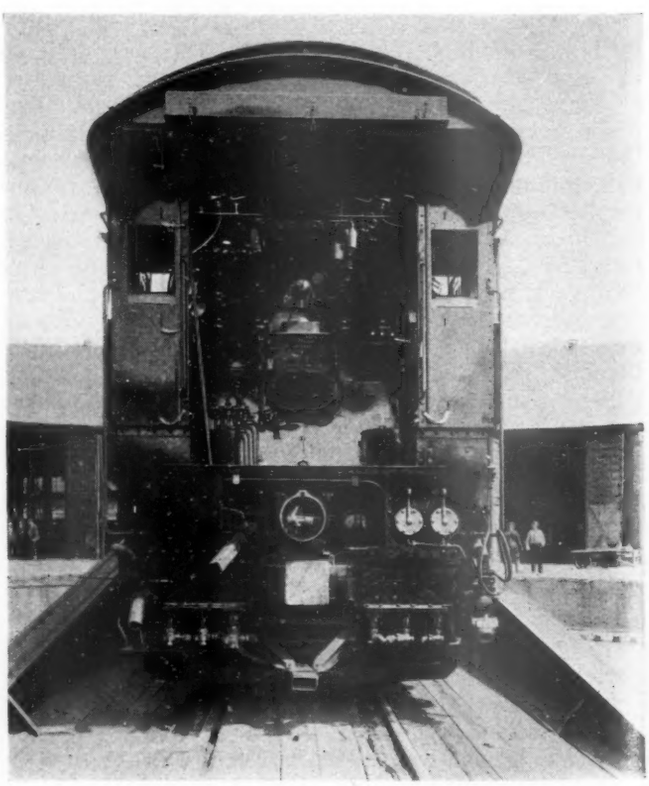
The boiler is fitted with an Elesco Type E superheater, with an American multiple throttle, and a Worthington Type 6-s-A feedwater heater having a rated capacity of 12,000 gallons per hour. A Nathan live-steam injector of the horizontal non-lift type with a rated capacity of 10,000 gallons is used. The safety-valve equipment consists of four Ashton 3½-in. Type FC-10 valves.

These locomotives are of the single-expansion articulated type and have four cylinders, cast integral with the frames, 24 in. in diameter by 30 in. stroke. With 275 lb. boiler pressure and 70-in. driving wheels they have a rated tractive force of 104,500 lb. The cylinders are spaced 92 in. on centers and have 12-in. piston valves with a maximum travel of 8½ in. The maximum cutoff is 75 per cent. The valves are operated by Baker valve gear which is controlled by an Alco Type H reverse gear. The crossheads and guides are of the multiple-bearing type. The axles, crank pins and rods are of open-hearth carbon-steel forgings, normalized.

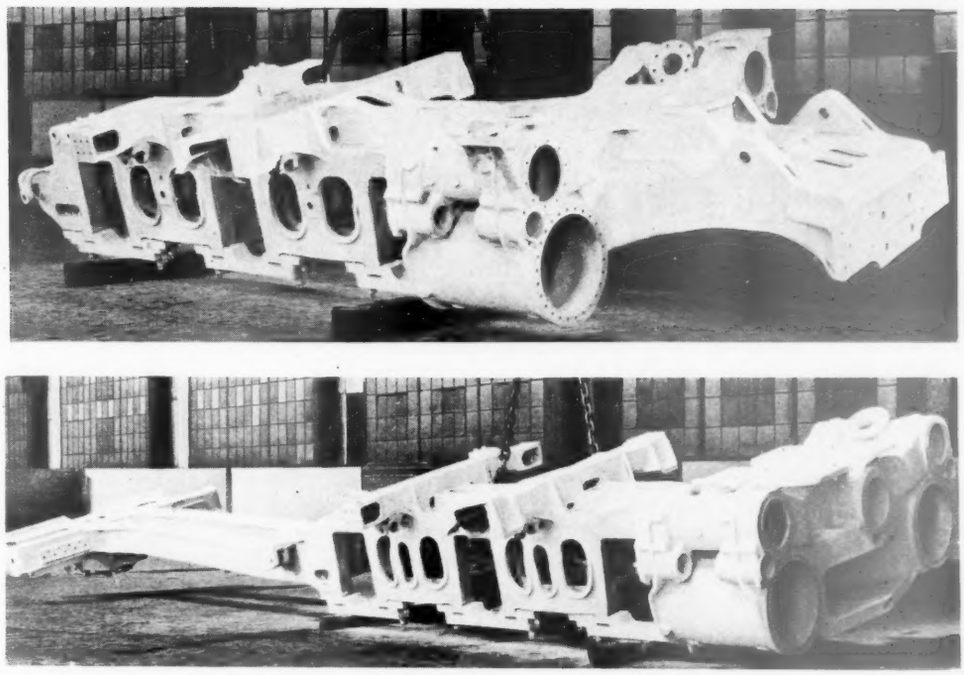
All of the wheels of both engines are equipped with Timken roller bearings. The tender of one engine has Timken roller bearings; the other has A.S.F. roller-bearing units. The driving-wheel installation is of special interest because it is the first of its kind. The driving-wheel assembly consists primarily of the wheels and axles, the axle tube or sleeve, the roller bearings and the driving boxes. The roller bearings are recessed into the driving-wheel hubs and the driving axles carry none of the locomotive weight, the weight being carried by the tubes. The outer races of the roller bearings are fitted into a recess in each driving-wheel hub and the inner races are pressed onto the ends of a finished axle sleeve, or tube. The axle tube is supported in the driving boxes. The axles are hollow bored.

In assembling the wheels and bearings the axle is first pressed into one driving wheel. The tube, with the roller bearings slipped on each end, is placed over the axle. The other driving wheel is then pressed onto the axle, after which the outer races of the bearings are placed in the recesses in the wheel hubs. The inner races of the bearings are then pulled to the ends of the sleeves inside the recesses in the wheel hubs where the rollers are made to contact the outer races. The assembly is completed by bolting the enclosure plates to the wheel hubs and clamping the driving boxes to the axle tube. This is accomplished by two pairs of wedges in the joints between the top and bottom sections of the driving box. The driving boxes are held in position on the tube by a backing ring on the inside end of each box and a three-piece adjusting spacer between the box and the inner bearing race. The driving boxes move vertically in the frame jaws between hardened bronze liners. The frame wedge is welded to the frame. The roller bearings are lubricated by grease which is forced into the bearing through fittings in the wheel hubs. The driving axles are of Timken design.

The roller bearings on the engine and trailer trucks are conventional Timken installations. The tender of



The Back Head and Cab Showing Connections between Engine and Tender



The Cast-Steel Beds Embody the Frames, Cylinders and Cross Members. The Weight of Both Castings Is 110,925 Lb. and Their Use Displaced Over 700 Parts. At the Top Is the Front Unit and at the Bottom, the Rear Unit

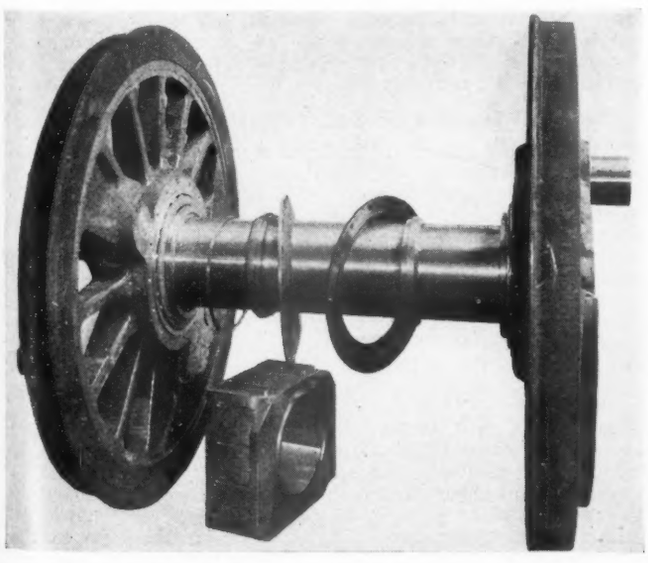
one engine is mounted on Buckeye six-wheel trucks with Timken roller bearings, and the tender of the other engine on Commonwealth six-wheel trucks with A.S.F. roller-bearing assemblies.

The engine frames, cylinders and frame cross members are all cast integral in two bed castings weighing 110,925 lb. which were furnished by the General Steel Castings Corporation. By the use of these cast-steel frames it is estimated that 66 major parts and 634 minor parts were displaced. The two-wheel engine-truck and the four-wheel trailer-truck frame castings were also furnished by the General Steel Castings Corporation.

High-pressure grease-gun fittings are used in numerous locations and two Nathan mechanical lubricators, actuated by the combination lever, supply oil from 33 leads to 72 outlets for the lubrication of the cylinders, steam chests, guides, steam-pipe slip joints, pedestal shoes and other surfaces.

The locomotives are equipped with Westinghouse No. 8-ET brake equipment, including two 8½-in. cross-compound compressors, mounted under the running boards on opposite sides of the boiler.

The rectangular water-bottom tender has a cast-steel frame which also forms the water bottom. The water capacity is 22,000 gallons and the fuel capacity is 26 tons. The loaded weight of the tender is 378,600 lb.



One of the Driving Wheels Showing the Roller-Bearing Parts

General Dimensions and Weights of the Norfolk & Western 2-6-6-4 Type Locomotives

Railroad	N. & W.
Builder	Railroad
Date built	May and June, 1936
Road class	A
Road numbers	1200 and 1201
Type of locomotive	2-6-6-4
Service	Fast freight
Rated tractive force, engine 75 per cent cut-off	104,500
Weights in working order, lb.:	
On drivers	430,100
On front truck	30,300
On trailing truck	109,600
Total engine	570,000
Tender	378,600
Wheel bases, ft. and in.:	
Driving	35—5
Engine, total	60—4¾
Engine and tender, total	108—7¾
Driving wheels, diameter outside tires, in.	70
Cylinder, number, diameter and stroke, in.	4—24 x 30
Valve gear, type	Baker
Valves, piston type, size, in.	12
Maximum travel, in.	8½
Boiler:	
Steam pressure, lb.	275
Diameter, first ring, inside, in.	91
Grate length, in.	166
Grate width, in.	106¼
Tubes, number and diameter, in.	57—2¼
Flues, number and diameter, in.	239—3½
Length over tube sheets, ft. and in.	24—1
Fuel	Bituminous
Stoker	Type MB
Grate area, sq. ft.	122
Heating surfaces, sq. ft.:	
Firebox and comb. chamber	530
Arch tubes	57
Firebox, total	587
Tubes and flues	6,063
Evaporative, total	6,650
Superheating	2,703
Comb. evap. and superheat	9,353
Tender:	
Style	Rectangular
Water capacity, gal.	22,000
Fuel capacity, tons	26
Trucks	Six-wheel

Roadmasters Held Profitable Convention at Chicago

High-speed trains, personnel, rails, ties and work equipment among subjects actively discussed

Part I

WITH its program so arranged that three separate sessions were devoted to problems of special import to its members, the fifty-first annual convention of the Roadmasters and Maintenance of Way Association developed much practical information. The meeting was held at the Hotel Stevens, Chicago, on September 15-17, with an attendance of 275 railway men in direct charge of track maintenance. One session was devoted to personnel problems, including an address on the organization of maintenance of way work, a committee report on the training of men for track foremen, and a talk on the subject of Safety, another session was devoted to the changes in track maintenance methods brought about by the operation of high-speed trains, with an address and a committee report. A third session dealt with the materials used in track maintenance, with addresses on both ties and rails and a committee report on the inspection of rail for renewal.

Other features of the convention included a committee report on the Use of Work Equipment to Secure the Greatest Economy in Track Maintenance, as well as a committee report on Rail Lubrication. Railway managements were represented on the program by A. N. Williams, president and general manager of the Chicago & Western Indiana and the Belt Railway of Chicago. F. E. Morrow, vice-president of the American Railway Engineering Association and Chief engineer of the Chicago & Western Indiana and the Belt Railway of Chicago, and T. H. Strate, president of the American Railway Bridge and Building Association and division engineer of the Chicago, Milwaukee, St. Paul & Pacific, offered greetings on behalf of their associations. Armstrong Chinn, chief engineer of the Alton and president of the Association presided over the convention.

At the closing session of the convention, B. E. Haley, general roadmaster of the Atlantic Coast Line, Lakeland, Fla., was elected president for the next year. Other officers and directors elected are as follows: First Vice-President, W. O. Frame, assistant superintendent, C. B. & Q., Wymore, Neb.; second vice-president, A. H. Peterson, roadmaster, C. M. St. P. & P., Chicago; secretary, T. F. Donahoe, supervisor of road, B. & O., Pittsburgh, Pa. (re-elected); treasurer, E. E. Crowley, roadmaster, D. & H., Oneonta, N. Y. (re-elected). Directors to serve four years: R. L. Sims, district engineer maintenance of way, C. B. & Q., Galesburg, Ill., and E. P. Safford, supervisor, N. Y. C., Silver Creek, N. Y. Director to serve three years: (to fill a vacancy) W. S. Lacher, engineering editor, *Railway Age*. Chicago was selected as the headquarters for the next convention.

On Thursday afternoon 200 members of the association visited the rail mill of the Carnegie-Illinois Steel Corporation at Gary, Ind., where opportunity was afforded to see the rolling and normalizing of rails. On Wednesday evening the roadmasters were the guests at the annual dinner of the Track Supply Association, which organization also presented an extensive exhibit in a room adjoining the convention hall.

Following are abstracts of some of the reports and addresses presented. Others will appear in a later issue.

President Chinn's Address

After reviewing the work of the association during the last year, President Chinn directed the attention of the members to the broader phases of their responsibilities as railway officers in part as follows:

We are today entering a new era in transportation. As the tempo of life increases, time becomes more valuable and it must be conserved in every way possible, especially the inactive time traveling, and the dead time of money tied up in raw and finished products moving from origin to destination. Along with these demands for faster and better service, our railroads are faced with ever-increasing competition, some subsidized and others only partially regulated.

How Can the Railways Meet This Competition? The answer seems to be in two parts. First, they must offer the public the kind of service it wants at a price it is willing to pay. Second, those interested in the welfare of the railroads, particularly railroad employees, should learn of the many benefits to the public that come from railroad transportation and then use every reasonable opportunity to inform the public and prospective patrons of these benefits.

What are the railroads doing to give better service? The answer is well known. Constantly engineers are bending their efforts toward perfecting safer, faster and more comfortable equipment, while maintenance of way men are improving and refining track structures so they will carry this finer equipment on its faster schedules with the safety and comfort for which it was designed. The improvements in freight service, while not so spectacular, have also been substantial and are of considerable value to shippers. Freight may now be picked up and delivered at the shipper's door and is now carried in trains that move on schedules that compare favorably in speed and regularity with passenger service.

Benefits of Rail Transportation

What are the benefits of railroad transportation to the public about which a railroad man may speak with pride? To start with, the railroads, outside of agriculture, represent the largest, most valuable and widespread industry in the country. They have 243,000 miles of lines, with 402,000 miles of tracks, extending to every part of the nation. There has been invested in all those facilities that go to make up the railroads, the tremendous sum of 25 billion dollars. This huge investment is owned by banks, insurance companies, schools, churches and a great number of individuals, all of whom have a direct financial interest in the railroads and in their success.

As industrial employers, the railroads rank among the largest in the country. They have on their payrolls during normal times more than 1,500,000 people. These employees are paid annually more than $2,500,000,000. This immense payroll is distributed over the entire country wherever there is a railroad line. These employees spend this money with the merchants in their communities.

In addition to the payrolls, the railroads contribute to the communities that they serve through the payment of taxes. Last year they paid a total tax bill of more than $236,000,000, and taxes are going up. An analysis shows that railroad taxes

are divided among the various governments and agencies about as follows: States 8 per cent, counties 15 per cent, townships 1 per cent, cities, towns and villages 13 per cent, roads 15 per cent, schools 46 per cent, and miscellaneous 2 per cent. It is difficult to imagine what many communities would do for schools if it were not for the railroad taxes that support them.

Furthermore, the railroads buy prodigious quantities of materials for maintenance, for operation and for improvements. In normal times annual railway purchases run well over $1,000,000,000. At present they amount to about $600,000,000 a year.

Any community that is to grow and develop must have transportation, good transportation that reaches every point in the nation, transportation that can be relied upon to function at all times and under all conditions. Last winter when conditions were particularly severe, when rivers and lakes were covered with ice, when highways were blocked with impassable drifts, when the air was full of snow and sleet and fog, when all other forms of transportation were at a standstill, the railroads kept their lines open and their trains moving.

The railroads offer the safest and most comfortable transportation available. They also offer speed, but speed with safety. The speeds at which railway trains operate today were unheard of a few years ago and have brought to the United States the railway speed crown of the world.

The comfort of railroad travel is unexcelled. Probably the greatest boon of all to travelers is air conditioned passenger equipment. In providing comfort for the passengers, maintenance of way men have not overlooked the track. Curves have been relined, spirals lengthened, and alinement and surface generally refined to give passengers a smooth ride with as little sensation of motion as possible.

Perhaps the proudest boast of the American railroads is their unparalleled record for safety. During 1935, while motor vehicles were killing 36,400 people on the highways, the railroads transported nearly 500,000,000 passengers without a single fatality in a train accident.

What other form of transportation can offer the people of the nation the advantages and the benefits that they receive from the railroads? In national value, in payrolls, in taxes paid, in materials purchased, in reliability of service and in safety, the railroads stand far out in front of any other transportation agency. As railroad employees, we have every reason to take pride in the industry we serve, to take pride in the part we have in that industry and to take pride in the story we may tell of its achievements.

The Railways Forge Ahead

By A. N. Williams*

Looking over the past seven years and reviewing the changes that have occurred in the railroad industry during that time, it is evident that the policy adopted by the railroads of plowing back into these properties a considerable proportion of their earnings during the period from 1920 to 1929 has been fully justified. An industry that has suffered a shrinkage of more than 50 per cent in gross revenues, has faced droughts, high water and bad snow conditions, loss of export traffic, dislocation of industries and other serious problems, and whose usual reservoirs of credit were closed; yet has been able to increase the speed of both freight and passenger trains, render better service than ever before, and maintain the highest safety record of any time in its history, is not an industry asleep, but a vigorous, resilient industry, able to cope with adversity and to accomplish results in the face of unprecedented difficulties.

Probably the most pronounced step in passenger service in the last few years was air conditioning and the increase in passenger train speeds. Air conditioning alone has cost millions of dollars and this has been financed by these railroads from current cash, without assistance from the usual credit sources, in the midst of a devastating depression. The introduction of high-speed trains has gone a long ways to recapture the good will of the American people. We, who have been in close contact with this movement, know what has been required in higher standards of maintenance for these high speed units. Track surface and line have had to be refined, spirals lengthened, signals respaced, track circuits re-arranged, track inspection intensified, and a considerable additional load placed on the maintenance of way and maintenance of equipment forces.

Little did we realize in the nineteen twenties, when we were spending a great deal of money for reconditioning track, bank widening, improving drainage conditions, installing new and strengthening existing ballast, laying heavier rail, installing rail anchors, manganese frogs and switch points, heavier joints, and so on, that we would so soon be called upon to demonstrate the wise decision made when this money was spent. There is no question that the American railroads as a whole are in better shape physically than they were 15 years ago.

While all of the railroad employees have had a hand in this, there is no one department that has contributed more in the way of loyalty, sacrifice and hard work than the maintenance of way department. It was largely your job to figure out ways and means to accomplish the result when the necessity was called to your attention. You did a splendid job!

Looking into the railroads' future, we find a changing picture ahead of us. Referring particularly to the maintenance of way department activities, we are today forced by necessity to modernize our methods. This means we must mechanize our steel gangs, providing them with power adzers, power drills, power spike drivers, etc. The present-day high speed trains make it absolutely necessary to give a different class of supervision than was formerly required. The responsibility for safe and comfortable travel is in your hands. A small defect in the track, which would not be noticeable at 40 miles per hour, might introduce a serious problem at 100 miles per hour.

With the new method of operation, it is incumbent upon supervisory officers of the maintenance of way department to take on increased responsibilities with respect to selecting and training employees for future positions. Nothing demonstrates a supervisor's ability more than to be continuously supplied with material coming along, from which foremen and supervisors can be made and to have ready and at hand, such material when the necessity arises.

* President and General Manager, Chicago & Western Indiana and Belt Railway of Chicago.

Discuss Effect of High Speed Trains

The greatest interest was manifested in the session devoted to a discussion of the effect of the new higher speed trains on the requirements of track construction and maintenance. The subject was presented in the form of a committee report dealing primarily with the changes demanded in the conduct of routine maintenance work and a paper by H. R. Clarke on the requirements for possible future increases in speed. Abstracts of the report and the paper follow:

Report on Tracks for High Speed Trains

The preparation of track for high speed operation and its subsequent maintenance are primarily matters of scrupulous attention to detail, rather than the development of any new construction or practices, according to a committee of which Walter Lakoski, division engineer of the C. M. St. P. & P., was chairman. Attention was directed to the fact that higher speeds have been attained on practically every railroad in the country. The inauguration of high-speed streamlined trains of entirely new designs led to the discovery that what we now call old-type equipment can compete with the new train if it is "opened up a little wider."

Citing excessive curvature as the most serious obstacle to high speeds, the report directed attention to the financial problem imposed in any program for curve revision, and even in changes in superelevation the necessity for considering the effect on slow as well as fast trains has introduced serious limitations on efforts to attain ideal conditions for the high speed trains. As the superelevation provided on any curve will produce a theoretically correct condition for only one rate of speed, care must

be taken to select the most suitable superelevation for the conditions at the particular point.

Covering the lengths of spirals, the committee offered the following:

It would appear that for speeds of 90 miles per hour on a one-degree curve, the spiral should be about 400 ft. long with 3½ in. of superelevation. Some railroads have a limiting superelevation of 6 in., while one railroad has a limiting superelevation of 4¼ in., maintaining a speed of 70 miles per hour around 2-deg. curves with 3½ in. of superelevation, and a speed of 60 miles per hour around 3-deg. curves with 4¼ in. of superelevation. As grades and physical conditions enter into this problem, each curve must be studied by itself.

Maintaining Tracks for High Speeds

The larger part of the report dealt with the problems that confront the roadmaster in the maintenance of tracks used by high speed trains, this portion of the report being abstracted below:

So far as track maintenance for high-speed operation is concerned, every roadmaster knows that surface, gage and line, not only on the curves, but on the tangents as well, require more attention than heretofore. From several sources, it develops that estimates of the increased attention necessary to insure accurate line, gage and surface run as high as 25 per cent.

It is still too early to tell whether mechanical deterioration of cross-ties will be increased. Rail is another large item, hut so far it has not been necessary to take out or relay rail because of high speed trains. It is somewhat too early to learn how much additional maintenance will be required on turnouts of either the rigid or spring-rail type.

There is no apparent move to revise maintenance organizations because of high speeds. Roamasters must find ways to renew ties and conduct other general maintenance work so as not to interfere with train service and at the same time accomplish what they have set out to do in the shortest time possible. More work is required in the maintenance of curves than on straight track, as the centrifugal force of trains passing around the curves tends to force the weaker points out of the true circular curve, resulting in a bad riding condition.

More Exacting Inspections

Regular and frequent inspections must be made of the tracks and their integral parts to detect any flaws in the material or workmanship that may develop into hazards. That high standards of materials, workmanship and inspection are being maintained is reflected in the freedom from accidents that can be ascribed to defective tracks and other faults that can be avoided by proper attention to important details.

The higher the speed, the greater the hazard and the roadmaster should train men to be on the alert to detect conditions in the track and other structures which will cause trouble sooner or later. It is no particular trick to know an actually dangerous condition in ties, switches, etc., but it is not so easy to detect this condition before it actually becomes dangerous.

Facing-point switches are a necessity that nobody likes. The camlock and interlocking have done much to reduce the potential hazard they introduce, but no foreman should pass a facing point or, for that matter, any switch without giving it at least a casual inspection, and a thorough check should be made periodically.

Fewer Slow Orders

The item that causes the most concern today is the slow order. It is necessary for the roadmaster to do more planning and arrange to do his work without slow orders or to keep them to an absolute minimum. No slow order should be allowed to remain any longer than is absolutely necessary.

Gaging the exact speed for which track is safe under high speed is important. Almost anything can get over it at five miles per hour but roadmasters and others should allow the highest speed possible in the face of any temporary condition, and not put on a 5-mile order merely because conditions are not right for full speed. Give the track 15, 20, 35 miles or whatever it will stand safely.

Necessary roadway signs must be maintained; they should be legible at all times, and be so placed as to provide the greatest visibility possible. Highway, farm and private grade crossings must be maintained in first class condition to avoid an accident on either the railroad or on the highway; trackmen must see that flangeways are clean.

The chief drawback to the roadmaster's work on a railroad is that his territory is long, but only as wide as the right of way, and he can only be in one place at a time. For that reason, and that alone, a roadmaster should see to it that his foremen are trained to accept responsibility for the territories under their supervision; with that accomplished he will rest better at night.

Discussion

In the discussion of this report, several members pointed out that it is not the high-speed operation of well-designed passenger equipment that is causing undue wear and tear on the track structure and concern among maintenance of way men, but rather the operation of heavy freight equipment, particularly locomotives, at speeds far in excess of that for which the equpiment was designed. Whereas the high-speed passenger traffic of those roads with the newer so-called "streamlined trains" has resulted in little increase in roadway deterioration, it was pointed out that the operation of heavy freight locomotives, inadequately counterbalanced for the speed at which they are run, is causing serious damage to the track.

Meeting Tomorrow's Requirements for Speed

By H. R. Clarke*

The response of the traveling public to the faster schedules indicates that those roads which have not yet established such service will soon be compelled to do so, and that efforts will be made further to reduce the over-all running time, so that the service the railroads have to offer may be even more attractive. In attempting to determine what the final maximum speed may be, there are two main factors to consider; the equipment and the permanent way.

The problem of safe and rapid deceleration is as important as acceleration. With the best equipment so far designed a train running at 90 miles per hour will travel a distance of about 4,000 ft. before it can be brought to a stop. As speed is increased the stopping distance must be lengthened or the appliances that stop the train made more effective. I shall not suggest that braking equipment may not be improved, but there are many factors which must be considered, such as the allowable brake-shoe pressures, wheel temperatures, adhesion of wheels to rails, possible damage to equipment, and safety and comfort of passengers. As a practical matter, some of these controlling factors have, I think, already approached the desirable limit.

Motive Power

In the discussion of motive power, there are three types of locomotives to be considered: (1) electric, (2) steam, and (3) internal combustion-electric. At the present time, except in particular locations where traffic is very dense or where cheap electric power is available, the electric locomotive may be eliminated from consideration.

When steam and Diesel-electric locomotives are compared, we find that both have advantages and both have their advocates. With either of these types of motive power there is a mechanical limit to possible speed. The direction of movement of the reciprocating parts of a steam locomotive can be reversed only a certain number of times in a minute, and this, combined with the diameter of the drivers, which also has a practical limit, determine the maximum possible speed. The speed limit on a Diesel-electric is governed by the traction motors. Here, the banding and gear ratio determine the speed, for if the motor speed is too high the centrifugal force will be so great as to expand the armature winding and break the banding wires. Inventive genius may, and no doubt will, develop improvements that will raise these restrictive limits.

I am not a mechanical engineer and do not want to pose as a prophet, but I should set 125 miles an hour as the practical economic limit for sustained speed, from the mechanical standpoint. Even at present speeds of 90 to 100 miles an hour, the overcoming of vibration in the cars has been a problem, and as the speed is increased, say, to the suggested 125 miles an hour limit, further improvement in car design, especially in springs, trucks and axles, will tax the skill of the car builders.

What of the Track?

If we accept this suggested limit as imposed by equipment or mechanical limitations, it then becomes a question as to whether the maintenance of way department can build and maintain a

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track structure that will permit such speed and whether the expenditure necessary can be justified economically.

For a number of years in the past, trains frequently have reached speeds of 90 miles an hour and over. These speeds have not been general, but have been attained in selected locations where track conditions were favorable. The new schedules call for sustained high speed with no chance to choose locations, so it becomes a problem of making all track as suitable for high speed as some track has been for a number of years, and to make possible the maintaining of high speed for long distances. This means the correction or elimination of conditions that restrict speed. To make long runs at high speed possible will require a higher standard of maintenance, a greater degree of refinement, more attention to detail, but no important change in the track structure. This conclusion is based on the assumption that motive power and equipment will be of suitable weight and design.

Slow Trains Also Involved

If the problem confronting the man responsible for track maintenance was simply that of keeping track in shape for lightweight, high-speed trains it would be easy, and it would not be hard if only heavy high-speed trains were involved. It becomes complicated and difficult when it is necessary, as it is and will be for a long time, to operate slow heavy trains, trains at medium speed and very fast trains on the same track. It is then that the trackman must weigh all factors, and reach a compromise on the methods and practices that will meet all the conditions involved satisfactorily and with least expense.

Straight or tangent track does not impose a serious problem; it must not be neglected or overlooked, but all that is required is good line and surface. Curves are the limiting factor in speed, and introduce elements requiring study and adjustment, and, of course, as curvature increases the difficulties multiply.

The Speed of Tomorrow

Assuming, as suggested, that tomorrow's speed is to be 125 miles an hour, what then? First, of course, the equipment, including decelerating appliances, must be designed for this speed. If an engine of the reciprocating type is used, the parts must be so lightened and the counterbalancing must be so exact that the dynamic augment and impact are reduced to such limits as the track structure will stand. Whatever type of motive power is used, the balance must be such and the centering devices so constructed and maintained that "nosing" will not be excessive. This is perhaps one of the most difficult problems to solve, but the effect of excessive "nosing" is one of the most damaging factors the maintenance man has to contend with.

In expressing the opinion that a speed of 125 miles an hour is possible without basic or extensive change in track structure, I have assumed that the equipment used will be comparatively light in weight and of proper design. I do not think 125 miles an hour is possible with the heavy reciprocating-type locomotives in general use today, without making very large expenditures to strengthen the track structure. The cost, in view of the thousands of miles of track involved, would, I think, be prohibitive. Even if the track structure could be made strong enough, the maintenance costs would be excessive. I think it will be decidedly less expensive to build equipment for the speed and service desired than to attempt to build and maintain track to carry heavy equipment at equal speed, so I feel that the burden is on the designer and builder of equipment.

Freight Trains

We must, of course, also consider freight traffic and I believe we must begin with the equipment, if speed much faster than the present is desired. It is very common today for freight trains to be operated at 60 miles an hour and possibly faster. To speed up the overall time of freight trains, I think the first effort should be to reduce terminal or yard delay. It is my opinion that we cannot expect a running speed much in excess of that now generally prevailing with present equipment, and certainly not unless tonnage is further sacrificed.

Improved Signaling

A most important factor in the safe handling of trains at high speed is proper signaling. Signals must be adjusted to the higher speed. This includes both automatic roadway signals and highway warning signals. The automatic roadway signals must be so spaced as to afford adequate braking distances. The highway warning signals must be so timed that warning will be given far enough in advance of the train to protect those using the highway, taking into account the speed at which the train is traveling.

A track circuit that will insure adequate warning in a train traveling at 125 miles per hour will start the warning signal too long in advance for a train moving at 25 miles per hour, and this will not only be resented by the public but will lead to practices that will actually increase the hazard. Signal engineers have made some progress towards solving these problems, but here again cost must be considered.

With suitable motive power and equipment, no great change in the basic track structure should be necessary. On the trackman's part it becomes a question of greater attention to detail. On tangent I think that 125 miles an hour is possible. It will require almost perfect line and surface, excellent tie condition and great attention to rail joints and rail ends so as almost to eliminate rail end batter. None of these is impossible if sufficient money is available.

Acceleration is slow in the higher speed brackets and each condition that causes a reduction below the cruising speed makes an on-time performance more difficult. Permanent speed restrictions due to physical characteristics require time to correct and often the cost is prohibitive, but a careful study of the line, checking it against a speed chart of the performance of the train will often show that a comparatively small and inexpensive improvement such as curve reduction at strategic points will result in a decidedly improved performance. Such a study is necessary to insure maximum results from the expenditure of such money as may be available.

The Human Side of Track Maintenance

One session of the convention was devoted to problems of personnel, being covered by a paper on safety, an address on organization and a committee report dealing with the recruiting of likely candidates for foremanships, their training and selection. Abstracts of these three features of the program follows:

W. F. Thiehoff Discusses Organization

W. F. Thiehoff, general manager, retired, of the Chicago, Burlington & Quincy, reviewed the marked changes that have taken place in the condition and requirements of track maintenance during the last 50 years and outlined the corresponding changes that have taken place in the organization, methods and equipment that have been necessary during the course of this marked transition. Turning his attention to more recent developments, he cited the marked increase in the average age of employees of the maintenance of way department as a condition that must be met by the exercise of special care in the selection of new employees, with a view to securing men of high caliber for promotion to higher positions.

Mr. Thiehoff made a special plea in this connection for the promotion of men from the ranks. The new employee, he said, should be encouraged to believe that employment gives him opportunity for advancement, depending on the capacity which he develops for increased responsibility through personal effort and experience, following the instruction and example of qualified employees and officers.

Roadmasters should talk with their foremen, he continued, and feel it their responsibility to check with them from time to time the qualifications, experience and development of the employees under their jurisdiction, encouraging the foremen in their efforts to employ and develop young men of good character and with capacity. The road to promotion is open, and advancement depends largely on these fundamentals. Assuming that we have

selected young men carefully, what next? Organize them into gangs, where by co-ordinated effort they may serve safely, using improved equipment and methods to produce efficiently and economically, and teach others to do so.

Citing changes in the organization of the maintenance of way forces, Mr. Thiehoff directed attention to the general trend toward the performance of the major operations with larger gangs, pointing to the economies that have resulted from putting this policy into practice. Thus, on the Burlington, he said, the cost of laying rail has been reduced as much as $125 to $150 per mile within a relatively short period. Turning next to the organization as a whole, he outlined the general features of the maintenance organization of the Burlington, showing how general supervision is maintained by system and district officers without interfering with the conduct of the work under the basic divisional organization where "the roadmaster is the backbone of track maintenance."

This organization has been in effect for a number of years, our feeling being that it is important to have all concerned in the expenditures responsible for the results. We believe this combination has developed a safe, consistent, co-operative and economical maintenance organization, still leaving authority with the officers actually on the ground and holding them responsible for the safe and efficient condition of the property.

Summing up, he said that the building of a maintenance organization begins with the employing officer who should use care in selecting young men and in educating them so that, step by step, they can qualify for advancement and in turn teach younger employees. The roadmaster and master carpenter should plan their work and assign qualified employees to the different kinds of equipment and tools, with such supervision for each unit as will employ it to capacity and consolidate the several units into a gang where co-ordinated effort will produce efficiently and economically.

Taking Accidents Out of Track Work

By E. A. Meyer*

By careful maintenance of the tracks and roadbeds, you men have made train travel almost safety perfect. However, while you have reduced train accidents due to track conditions almost to a minimum and have looked well to the safety of the traveling public, some of you, while accomplishing these important objectives, have overlooked the equally important matter of safety for yourselves and your fellow workers.

Many people seem to think that any one can work on the section and that no instruction, supervision or training is necessary. Even some of the foremen seem to have this idea. No beginner in track work knows how to do the work properly—he must be shown. There is a right way to do every job, even to the starting of a track spike in a tie. There is a wonderful opportunity for the foreman and the supervisor to see that their men form good habits instead of bad ones. The bad ones are difficult to break and frequently cause accidents.

It is a great satisfaction to work where there are safety rules and it is a greater satisfaction to work where these rules are enforced. But the greatest satisfaction of all is experienced when the rules are being observed and men are not receiving injuries.

I could enumerate many "do's" and "don'ts" but you all know how the work should be done. You know the right way. You know the safe way. The crux of the campaign to take accidents out of track work is proper instruction and supervision, with the necessary follow-up to see that the instructions are obeyed. These functions must be carried out by the foreman in direct charge of the men. They cannot be delegated to someone else.

Before high speed trains were placed in operation, it was necessary to increase the superelevation on curves and to lengthen the spirals. Such a procedure was necessary to the safe operation of high-speed trains, and it follows also that definite instructions must be adhered to if injuries in the maintenance of way department are to be prevented. The thought I want to bring out is that for the successful completion of any piece of work, it is just as important to have definite plans for working safely as it is to have definite plans for working efficiently.

* Chairman, Safety Section, Association of American Railroads and Manager Safety and Fuel Departments, Chicago, Milwaukee, St. Paul & Pacific.

Report on Selecting and Training Track Foremen

Satisfactory results in the selecting and training of foremen call for a systematic procedure, effectively applied, for hiring new men, training and advancing them to the position of foremen, and subsequently continuing their training and education, according to the report of the Committee on the Selection and Training of Track Foremen, of which G. T. Anderson, roadmaster, Kansas City Southern, was chairman.

There are certain fundamental and basic qualities or characteristics of a man that cannot be altered by training, the committee pointed out. Psychologists generally recognize that intelligence is an inherited characteristic, and that many, if not most, of the traits of personality are developed in the formative period of early youth. Physical strength and resistance to certain diseases are to some extent hereditary. We have much to learn concerning the development of a practical system whereby the characteristics of men may be determined so they may be placed in the position for which they are best fitted. Where it may be applied in a practicable manner, a system of intelligence tests is recommended for determining the fundamental characteristics in prospective foremen.

The committee also stressed the importance of a sound sense of honesty and justice, and the ability to maintain cordial relations with fellow workers and the public. The ability to associate with the public is especially important in foremen because in many instances they constitute the sole source of contact between the railway company and the public.

Since track maintenance is outdoor work involving exposure to the elements, particularly in times of emergency, a rugged physical constitution is a necessity. Because of the dangers associated with track work, good vision and hearing are also fundamental requirements. Physical examinations should be employed to determine whether recruits have the necessary requirements in these respects.

Commenting on education, the committee suggested that a high school education should be a fundamental requirement, and added that the extent to which new men having desirable characteristics may be drawn into railway service depends upon the inducements offered them. The most important of these are steady employment, good wages, suitable living conditions, efficient supervision, and opportunity for advancement. As a further inducement, it was suggested that every practical means be adopted to provide steady employment for the most desirable employees. It also cited the pass privilege and insurance and hospital benefits as further advantages of railway employment, but urged greater efforts to provide better living conditions, stating that section headquarters should be located with a view to affording comfortable and sanitary living conditions and the best public school facilities that may be available. For floating or specialized gangs, suitable outfit cars with comfortable and sanitary living quarters and well prepared food are well worth their cost.

To provide incentive for workmen, it was recom-

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The Delaware & Northern Locomotives Brought Cameras into Play

700 "Fans" on an Excursion from N. Y.

New York Central and Delaware & Hudson let them blow whistles, and exhibit the inside of railroad operation

THE New York Central, with the co-operation of the Delaware & Hudson, on Sunday, September 20, ran its "second railroad wonder trip," from New York to Kingston, N. Y., Oneonta and Albany, at a fare of $4. A total of 650 paying passengers and some 50 or more "deadheads" took the trip, being handled on two special trains. The first "wonder trip" of this company was run on November 17, 1935, and had about 500 passengers. Co-operating with the railroads in operating these excursions have been the two "fan" organizations—the Railway & Locomotive Historical Society and the Railroad Enthusiasts, but passengers included many others besides members of these societies, and the magazine "Railroad Stories" also co-operated by interesting railroad hobbyists in the excursion.

These excursions are in contrast with the usual operations of this kind in that the railroad itself—rather than some holiday resort—is the principal object of interest of the excursionists. The "second wonder trip" was planned with this fact in mind. At Weehawken, N. J., where the trains started, an exhibit of typical New York Central and New York, Ontario & Western locomotives was on view—all under steam. An engineman was on duty in each and passengers were permitted to inspect them and photograph them and have their questions answered to their hearts' content. Most important of all, they were also permitted to blow the whistles and ring the bells. The din was terrible, but the satisfied smiles of the customers was worth the agony.

From Weehawken, the two special trains went up the west bank of the Hudson on the West Shore line of the New York Central to Kingston, N. Y., 89 miles. Here the trains were switched onto the road's Catskill Mountain branch (until recently the Ulster & Delaware Railroad) for the 104-mile scenic run to Oneonta. Each train on this run was pulled by two relatively small 10-wheelers (large engines being barred), and a third engine as a pusher was needed twice on the trip (there being one grade of 3.2 per cent and three others of approximately 2 per cent, uncompensated, on the line). This was "railroading" to the fans' fancy, as could be seen from their zeal in taking pictures (almost every passenger had a camera of some kind). At Arkville, about midway between Kingston and Oneonta, a stop

Inspecting Work Equipment at Oneonta

was made and the passengers were delighted to find on an adjoining track an old American type locomotive of the Delaware & Northern.

(The enthusiasm of some of the passengers went a little far at times. They could not, apparently, stand the sight of a hand-operated turntable in idleness. When the switch-over to the Catskill Mountain branch was being made at Kingston, one lad, old enough to know better, pulled the coupling pin on the last car, and a portion of the movement was made with only the safety chains holding this car in the train. But the railroad had a plentitude of supervisory officers aboard and enthusiasm of this kind was promptly checked before any harm resulted.)

At Oneonta the Delaware & Hudson had its enginehouse and shops ready for inspection, with a large force of supervisors on hand to serve as guides. In addition,

Learning About Locomotives at Weehawken

a selection of freight, passenger and work equipment, typical of the company's rolling stock, was on view. Among the locomotives displayed by the Delaware & Hudson were the experimental high-pressure 1400 class, headed by the "L. F. Loree." Since the day was Sunday, the shops were not in operation, but the equipment was left with work in progress so that the visitors could see how operations were carried out. Incidentally, the extreme neatness of everything around the enginehouse, shops and store house made a deep impression on all.

The display at Oneonta was arranged under the direction of G. S. Edmonds, superintendent of motive power of the D. & H. and G. W. Ditmore, master car builder.

Leaving Oneonta, the trains proceeded to Albany (82 miles) on the historic Albany & Susquehanna line of the

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Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended September 12, which included the Labor Day holiday, totaled 699,859 cars, a decrease of 64,821 cars as compared with the week before but an increase of 73 cars as compared with the corresponding week of last year which did not include the holiday. All commodity classifications except live stock showed reductions as compared with the week before but all except coal, live stock, and grain and grain products showed increases as compared with last year. The summary, as compiled by the Car Service Division of the Association of American Railroads, follows:

Revenue Freight Car Loading

For Week Ended Saturday, September 12

Districts	1936	1935	1934
Eastern	135,126	142,756	134,918
Allegheny	140,453	130,292	115,260
Pocahontas	51,730	53,496	44,147
Southern	100,200	97,962	87,321
Northwestern	110,797	114,783	100,619
Central Western	102,784	105,925	105,754
Southwestern	58,769	54,572	59,466
Total Western Districts	272,350	275,280	265,839
Total All Roads	699,859	699,786	647,485
Commodities			
Grain and Grain Products	27,718	43,803	37,794
Live Stock	17,704	17,724	35,140
Coal	121,195	138,457	118,118
Coke	9,007	6,444	5,253
Forest Products	31,879	31,254	22,657
Ore	51,779	35,649	25,608
Merchandise L.C.L.	148,910	164,383	163,978
Miscellaneous	291,667	262,072	238,937
September 12	699,859	699,786	647,485
September 5	764,680	591,941	563,883
August 29	753,742	680,848	647,531
August 22	734,973	625,774	606,917
August 15	736,497	614,005	601,788
Cumulative Total, 37 Weeks	24,582,012	21,775,329	22,071,870

Car Loading in Canada

The compilation of the Dominion Bureau of Statistics shows that car loadings in Canada for the week ended September 12 totaled 52,909 as against 54,353 last year, but the second week of this September included the Labor Day holiday, which fell in the first week last year.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
September 12, 1936	52,909	19,427
September 5, 1936	58,512	22,083
August 29, 1936	55,641	21,078
September 14, 1935	54,353	19,658
Cumulative Totals for Canada:		
September 12, 1936	1,669,526	846,882
September 14, 1935	1,604,964	781,077
September 15, 1934	1,597,053	810,169

THE SOUTHERN OF GREAT BRITAIN is rapidly completing arrangements for the inauguration of its new English channel train ferry service, according to a recent statement from the Associated British Railways, Inc., New York. When the new service is inaugurated, rail travelers will "be able to go to sleep on a train in England and wake up in any of the leading capitals of Europe," the statement points out. Three train ferries, specially built for the service, will each carry cross-channel trains of 12 passenger cars or 40 loaded freight cars. The ferries are 360 ft. long and 60 ft. wide, with a draught of 12 ft. 6 in. Previous transfer difficulties caused by the rise and fall of the tides have been solved by the building of locks on both the English and French shores.

Speeding Up Terminal Operations

Proper organization of forces and planning of facilities accomplish much

TERMINAL design and operation were considered in detail at the convention of the American Association of Railroad Superintendents last June. A report on expediting the movement of cars in yards and terminals was presented by a committee of which F. F. Laird, supervisor yard and terminal operations, Chesapeake & Ohio, Richmond, Va., was chairman.

This report is abstracted below:

Formerly, the objective of railroad transportation was the production of revenue ton miles at a minimum cost, and while the cost per ton is still the measuring stick of transportation efficiency, the element of time has become an important factor in the control of tonnage. The approximate maximum train speed between terminals with present motive power and equipment has been approached, but, in the majority of cases, tonnage has been sacrificed. One must look to economies to be found in yard and terminal operations to offset the rising ton mile cost in road train movement.

Organization

Every result of value is dependent upon the efficiency of the organization, and proper organization involves the following features:

(1) The educational background of employees
(2) Their physical faculties
(3) Their mental attitude
(4) Personality
(5) Habits
(6) Rapidity of development
(7) Surplus, or deficit, of available material to meet requirements in the next 5 or 10 years
(8) Normal annual requirements
(9) Opportunity for advancement

The entire personnel should be classified in accordance with the above principles, and the results carefully studied and systematically catalogued to determine the most productive source of supply.

Yard Facilities

The number of tracks in the receiving yard should be adequate to protect the usual peak train arrivals, with sufficient capacity to preclude the necessity for doubling over. The number of tracks in the classification yard should be governed by the number of classifications necessary to minimize time in succeeding terminals, plus such tracks as are normally required for "hold" cars, reverse movements and miscellaneous subdivisional cars for later classification. Only such classifications as further the movement of a car should be made in any terminal, and the length of the classification tracks should be governed by the usual number of cars per cut. Tracks used exclusively for classification purposes should be of no greater capacity than requirements necessitate, and such tracks should be definitely assigned to their respective classifications. If the business volume to a single destination is consistently sufficient to permit the operation of solid trains, facilities should be adequate to protect such movements. Forwarding tracks should be of sufficient capacity to hold the engine, train and caboose. Engineers recommend that the gradient of receiving and forwarding tracks, when adverse to the forwarding movement of the train, be at least 20 per cent less than the ascent governing the tonnage of the train in its road movement.

Inadequate receiving, classification and forwarding facilities, and time lost in doubling over, cause far-reaching delays. In eliminating such delays system rather than divisional movement should be considered, and the time consumed from the point of origin to the final track placement, or delivery to connecting lines, should be the governing factor. Sufficient repair tracks should be provided and their location should be as advantageous as practicable from the hump, switching ladder, or thoroughfare tracks, while the capacity should not exceed 15 cars as an average (figuring 58 ft. per car to allow for ample spotting space). Such tracks should be spaced to meet conditions, and whether they are stub or connected tracks should depend upon the location and switching situation.

The location and capacity of caboose tracks, switching leads and ladders, ice plant, stock pen and scale tracks and thoroughfares should be studied. Improved methods of switching hold tracks, house, team, and storage tracks afford much opportunity for increased efficiency.

Repairs should be made in the receiving yard immediately following inspection, insofar as practicable, and it may be found advantageous and economical to do some of this work at icing plants, and on storage, house, team, hold and other miscellaneous tracks.

The classification method should be based on the following:

(1) Saving of time in the complete movement of the car
(2) Elimination of duplicate effort in other terminals
(3) The proper terminal in which to make the classification

Motive Power

The modern switching locomotive represents an important investment, and every effort should be made to attain the maximum number of hours per locomotive employed. Some engines may be worked as much as 24 hours per day for a month without interruption to the service. The cleaning of fires and pans can be accomplished during the meal period, and at the same time coal and water may be replenished.

Cabooses should be pooled in all through train operations. While the saving in investment, interest, taxes, depreciation and maintenance cost are important on the larger railroads, the time saved in the movement of trains is of even greater importance.

Schedules—Yard and Road

Road schedules have a marked effect on the operation of most yards, particularly when the operation is single track, and it is important that they be well balanced and dependable. The time allocated to terminals should be sufficient, but never excessive; conversely, terminal operations should be so arranged as not to delay road operations. The starting time of extra trains should be governed by terminal schedules indicating the most advantageous departure times. There is opportunity to develop ways and means for saving time if this situation is carefully analyzed.

Main tracking of through trains affords much opportunity for expediting the movement of all trains.

Many trains can be run through one of more terminals without pulling into a yard track if they are properly classified initially. To attain the maximum efficiency in such operations a study of pick-up and set-out movements, handling certain cars in other trains, and changing terminals for certain classifications, are necessary.

Slovenly inspection activities, failure to couple air hose in classified cuts, failure to check the coupling of cars in cuts, the handling of cabooses, the movement of road power to and from the engine terminal, failure to have the yard engine in proper position, inertness in executing signals, icing of engine and caboose watercoolers, proper ready track inspection, slow movement of trains leaving forwarding tracks, are all fruitful sources of delay, and standards of time should be established for all terminal operations involving such factors as:

(1) Arrival to inspection
(2) Arrival to classification
(3) Classification to departure
(4) On duty to departing time

Once established, these standards should be policed and changed to meet the increased efficiency this system will develop.

Inspection

Inspection may be divided into the following units:

(1) Safety appliance
(2) "A" inspection
(3) "B" inspection
(4) Air brake inspection
(5) Lading classification inspection
(6) Pit inspection
(7) Over head inspection
(8) Special inspection of loaded refrigerator cars

Every unit is important, and productive of much general safety insurance. Every inspection unit is a definite necessity, regardless of delay to cars and increased labor costs; however, there must be a minimum, and there should be a maximum. The happy medium of efficiency lies somewhere between these two points.

A copy of the Safety Appliance Act, together with a clear and concise set of inspection rules, should be prepared and placed in the hands of every one concerned with car and train movement. The instructions should define the prerogatives of the yardmaster clearly, in designating where inspection of a train or cut of cars shall stop, to save time in a switching operation, and should portray specifically the method of protection when intermittent inspection is in progress. A school of inspection should be a part of the school of air brake instruction.

It is recommended that a committee be formed by the Association of American Railroads to make a survey of this important phase of transportation, and that the personnel of this committee be composed of representatives of the bureau of safety of the Interstate Commerce Commission, mechanical and air brake engineers, and experienced car department and transportation officers, whose job would be to set up safe and practicable standards of inspection.

Efficiency

Efficiency tests should be conducted in every yard and terminal to determine rule compliance, methods, practices and capability of employees, and to bring to light any improper signaling or rough handling. Where the scheduling of industrial operations is practicable, it is conducive of much satisfaction on the part of shippers; and frequently tends to speed up operations.

Proper and adequate communication is a definite requirement in saving time. The telephone, the teletype, and a system of light signals are all practical; however, the service requirements will govern the system to be used. Flood lights usually speed up switching and expedite the movement of cars and trains. Switch lighting and numbering are also definite time saving factors.

Waybills

Carload movement frequently sustains serious delays at the point of origin waiting for billing, causing serious delay to other freight in the train in which it moves, and also frequently causing cars to miss connecting line schedules. The situation is even more complex with less-carload freight. This is a problem to be solved by agency and accounting experts; however, much can be accomplished through the installation of teletype machines, the use of a standard form of multiple billing, comprising bill of lading, waybills and freight bill, and arranging for the billing to be completed at designated intermediate points, or at final destination. All wheel reports should be compiled in yard offices, and they should be a combination consist, wheel report, and passing report containing all the necessary data for succeeding terminals, car accountants and traffic representatives. They should be compiled in train order from engine to caboose, and be transmitted immediately by the most efficient method, to the car accountant and the succeeding terminals affected, and to such traffic representatives as require the information. Cars handled intra-divisionally should be accounted for by the conductor, and this information transmitted as a supplement of the original wheel report at the final terminal of the train.

Car Distribution and Interchange

Current instructions should be issued covering the handling of empty equipment, and providing definite disposition of cars made empty in yards and on line of road. In addition, a system should be perfected for securing "home route" data with a minimum of delay. Most direct-connection cars can be covered by standing instructions. A survey of divisional and subdivisional car requirements should be made and an advantageous point selected for concentrating such cars for later distribution, based upon a minimum of empty car miles, and, where it is practicable, classification inspection should be made at concentration points.

Co-operation in effecting sufficiently frequent interchanges to insure a minimum of delay in the movement of all connecting line cars is essential. The bunching of as many single destination cars as possible by the delivering line and, where practicable, the segregating of loads from empties tends to expedite the movement. A service for handling transfer cuts with the initial crew, caboose and motive power over connecting terminals, belt and switching lines to final destination is recommended. The savings derived from such operations justify such changes of organization and operating agreements as may be necessary in balancing crew and engine service.

The importance of yard and terminal operation is increasing with respect to transportation efficiency and it is such an important function as to merit constant survey and analysis. A permanent committee composed of transportation, engineering, mechanical and car department units should be formed to work under the direction and supervision of the Association of American Railroads to study this important problem. Such a committee would standardize methods of operation, outline efficient practices, formulate practical rules, devise and standardize practical activities, determine cost and other reports necessary as measuring sticks of efficiency, and be an invaluable aid in the development of new yards and terminals.

Fuel and Traveling Engineers' Associations Unite

Two groups join forces after 27 years and 44 years, respectively, of separate functioning

IN the interests of economy and increased effectiveness, as well as to meet the wishes of higher railway officers, the International Railway Fuel Association, organized 27 years ago, and the Traveling Engineers' Association, which has been functioning for 44 years, have united to form a single association known as the Railway Fuel and Traveling Engineers' Association. The announced objective of the new association is "To improve the locomotive service and the use of fuel on all railroads," and it was formally organized at joint business meetings of the two associations held at the Hotel Sherman, Chicago, September 15 to 18, inclusive.

The work of actually merging the two associations was performed by a special committee of 12 men from each, duly authorized to effect the consolidation, elect temporary officers, appoint committees and conduct the affairs of the association during the current year. International Railway Fuel Association members elected to represent the association on this special joint committee included: President C. I. Evans, M-K-T; J. D. Clark, C. & O.; A. A. Raymond, N. Y. C.; R. Collett, St. L.-S. F.; J. R. Jackson, M. P.; E. G. Sanders, A. T. & S. F.; C. N. Page, L. V.; L. E. Dix, T. & P.; M. F. Brown, N. P.; G. H. Likert, U. P.; J. E. Davenport, N. Y. C., and Secretary-Treasurer, T. Duff Smith. The Traveling Engineers' Association elected as its representatives on the special committee: President A. T. Pfeiffer, N. Y. C.; M. A. Daly, N. P.; J. M. Nicholson, A. T. & S. F.; Ralph Hammond, N. Y. N. H. & H.; G. M. Boh, Erie; W. C. Shove, N. Y. N. H. & H.; J. C. Lewis, R. F. & P.; J. J. Kane, L. V.; C. C. Kipkins, Penna.; A. E. Johnson, C. M. St. P. & P.; W. H. Davies, Wabash, and F. P. Roesch, Standard Stoker Company.

At the first meeting of the joint committee, presided over by F. P. Roesch, the following officers were elected to conduct the affairs of the association during the coming year, which includes presiding at the 1937 meeting: Chairman, J. D. Clark; Vice-Chairman, C. I. Evans; Vice-Chairman, A. T. Pfeiffer; Vice-Chairman, F. P. Roesch; Secretary-Treasurer, T. Duff Smith, the latter having offices at 1660 Old Colony building, Chicago. The following committees were appointed: Committee on Constitution and By-Laws, R. Collett, J. R. Jackson, M. A. Daly, J. E. Davenport and L. E. Dix; Committee on Committees; A. A. Raymond, G. H. Likert, W. C. Shove, G. M. Boh and C. C. Hipkins; Committee on Audit and Transfer, T. Duff Smith, C. N. Page and F. P. Roesch; Committee on Subjects for the 1937 Annual Meeting, J. M. Nicholson, A. T. Pfeiffer, M. F. Brown, W. H. Davies, J. C. Lewis and R. Hammond.

Informative Committee Reports Presented

During the course of the meetings of the two associations, at which there was a total registration of approximately 300, numerous informative reports were presented for consideration. The Traveling Engineers' Association discussed The Function of the Traveling Engineer, What Has Been Accomplished by Extending Locomotive Runs, Brakes on High-Speed Trains, and High-Speed Passenger Locomotives.

In addition to receiving the usual standing committee reports on fuel economy devices, stationary boilers, firing practice, fuel stations, etc., the International Railway Fuel Association was addressed by C. F. Richardson, president of the West Kentucky Coal Company and by Lewis Ware, president of the United Electric Coal Company.

The report of the Committee on Fuel Distribution and Statistics, read by Chairman E. E. Ramey, B. & O., again pointed out the need for a new measure of fuel economy which would take into account the substantial increase in train speeds. It explained why the factor "lb. of coal per 1,000 gross ton-miles *per hour*" is not a proper statistical index, and proposed, as a basis for discussion and further development, a new "speed-fuel performance" factor which involves an engineering analysis of the design of the average locomotive by the following method:

1—Determine the capacity and the approximate general design of "the average locomotive used."

2—Determine an average percentage of capacity at which this average locomotive is used under the average condition of operation.

3—From the engineering analysis of the designated design and of its theoretical performance at the determined percentage of capacity on a rate of grade selected as representative of the engine runs, calculate the unit fuel consumption (lb. of coal per 1,000 gross ton-miles) at the various speeds between chosen limits.

4—From the unit fuel consumption shown for each speed as the base, compute the percentage of increase in the unit fuel consumption for each of the higher speeds.

5—Construct a table and a chart of curves showing these determined values in terms of (a) speeds, and (b) percentages of increased unit fuel consumption,—so that the chart may be read as follows: "Other factors remaining unchanged, an increase in speed from (a) m.p.h. last year or last month to (b) m.p.h. this month's accounts for an increase of (x) per cent in unit fuel consumption (lb. of coal per 1,000 gross ton-miles).

It should be kept in mind that the final result of this plan is a set of relative values stated in terms of percentage of increase from the selected base values. Therefore, neither the particular operating factors selected as representative of the operating conditions, nor the method used in calculating the locomotive characteristics, nor the resulting values in terms of pounds of coal per 1,000 gross ton-miles for each of the speeds included in the computation are of absolute significance as long as the basic factors and the methods chosen are carried uniformly through the calculations.

[The committee here included detailed tables and

charts showing how the new method would be applied in a specific case.—Editor.]

The method here proposed is limited of course, to the comparison of results of operation at different speeds with the same "representative locomotive" and no valid comparison may be made of two periods separated by an interval during which any significant change has taken place in the characteristics of the "representative locomotive."

Full recognition must be accorded the difficulty involved in the selection of a locomotive design, the characteristics of which are truly representative of the average locomotive in use, where a great number of different classes of locomotives are in service. However, it is considered to be practicable to accomplish this objective with a good degree of accuracy if the problem is carefully studied upon the basis of the statistics of locomotive operation generally available on our railroads.

It is our conviction that this method may be utilized by any railroad to determine fairly closely the effect of the increased speed of its trains upon its unit field consumption and we have not discovered any other logical method by which this result may be approached.

One of the new committees to report this year was that on Valve Motion and Its Effect on Fuel Economy. In presenting this report, Chairman M. F. Brown, N. P., stressed the importance of adequate valve-motion design and maintenance and urged that dynamometer-car tests be used more extensively as a measure of valve-motion performance and in the interests of fuel economy and securing the maximum results from steam locomotives. He also said that more effective means should be taken to instruct and educate firemen who will in a short period of time replace many enginemen scheduled for early retirement.

Another report of unusual interest was that of the Committee on Steam Turbine and Condensing Locomotives, presented by Chairman L. P. Michael, chief mechanical engineer, C. & N. W. The latter part of this report is quoted in full below:

Steam Turbine and Condensing Locomotives

Every year, beginning with 1928, this committee has proposed and recommended a condensing steam turbine for use on locomotives, except for the year 1933, when it proposed a uniflow engine. This was for the reason that when it was proposed to use a direct geared drive from turbine to the axles, instead of an electric transmission, some of the manufacturers were very indifferent about developing the designs for the direct geared transmission. However, in 1934, as stated above, two large manufacturers, one of turbines and the other of gears, jointly, designed a steam turbine, speed reduction and reversing gear direct drive transmission. This proposed change in design would materially increase the efficiency of the power plant and would also reduce the weight to about two-thirds of what would be required for a locomotive with an electric transmission, and undoubtedly would reduce the first cost and maintenance cost of the locomotive in the same proportion.

The electric transmission is very desirable in that it makes an exceptionally flexible drive and provides very high uniform torque at starting and low speeds. However, the efficiency is very low, ranging from about 50 per cent to about 75 per cent maximum.

On the other hand, the direct geared transmission also gives very flexible operation and a sufficiently high uniform starting torque, and the efficiency will range from about 75 per cent to about 95 per cent maximum. In other words, in round figures, the lowest efficiency of the direct drive, turbine to axle, is equal to the maximum efficiency of the electric drive, turbine to axle. This higher efficiency of the direct drive transmission coupled with the fact that this design of turbine condensing locomotive will weigh from 25 to 35 per cent less than a turbo-electric drive transmission locomotive, we believe is good and sufficient reason for recommending the use of the direct drive transmission.

The press for some time has been proclaiming the building and putting into service of huge double unit locomotives, indicating the weight in hundreds of tons and the horse power in four digit figures and then following this up by stating that these locomotives were for pulling light weight streamlined passenger trains:

Huge high powered locomotives for pulling light weight trains! Something is wrong when such condition prevails, and indicates that the proper refinement in design has not been utilized in constructing motive power so it will more nearly harmonize with the construction of the lighter weight passenger cars now being built.

If the weights of such motive power units, as referred to above, were tabulated and indicated in percentage of the total weight of train, which they will handle satisfactorily, the resulting figures would be astounding. This is one of the several good and sufficient reasons this committee has had for persistently proposing and recommending a steam turbine condensing locomotive with direct gear drive which will cost more than the present standard steam reciprocating engine type locomotive, but will weigh less, cost less, and cost less to operate, and require less maintenance, and will also provide much greater availability than any of the types of motive power now in service.

It is with pride and gratification that this committee realizes and appreciates the fact that through its nine long years of hard work, it has stimulated sufficient interest in the steam turbine locomotive to bring it to the attention of the manufacturers and the railroads, and that through its efforts the first steam turbine powered locomotive will soon be built in the United States.

This statement is substantiated by the fact that the press has recently announced the placing of an order by the Union Pacific, for a steam turbo-electric condensing locomotive to be manufactured by the General Electric Company.

The order was not placed for the new steam turbo-electric condensing locomotive until the designs submitted by the manufacturer had been thoroughly checked by the newly established research department of the railroad, and also a further check and research made by an engineer having a very broad railroad, manufacturing and operating experience.

This committee is pleased by the fact that the preliminary information obtainable indicates that this locomotive will be practically a duplicate in wheel arrangement, weight, horse power, tractive power, and in fact each of the two units will have the same general design as was submitted by this committee seven years ago and printed in the 1929 annual proceedings of this association.

The principal difference in the design is in the wheel arrangement of 4-6-6-4 instead of 2-6-6-2, and the use of a higher pressure boiler using oil for fuel instead of coal as proposed by this committee in its report for the year 1929.

We are glad that this committee, through its efforts, has been able to assist in bringing about new development. We believe that the placing of the order for this steam turbo-electric condensing locomotive has started a new era of development of motive power with the continued use of steam for the prime mover.

Motor Transport Section

Taxi Service Is Available to C. R. & I. C. Passengers at Both Terminals in Conjunction With Their Railway Tickets

Collection and Delivery of Passengers

Cedar Rapids & Iowa City increases traffic over 100 per cent by new services

FROM the beginning of its operation in 1904 until the advent of highway competition, the Cedar Rapids & Iowa City electric interurban railway enjoyed annual passenger revenues of about $360,000. By 1935, however, these revenues had been reduced about 90 per cent, despite all efforts to preserve them. Since June 2, 1936, the trend has changed and monthly increases of more than 100 per cent in passengers handled have been enjoyed. This has been brought about by reduced fares, improved service, and by the installation of what is believed to be the first complete "collection and delivery" service for passengers in the country. This latter feature involves the selling of one or more taxi coupons in conjunction with the railway ticket, at the nominal charge of 10 cents per ride, so that the passenger may, if he wishes, be called for at home by taxi, taken to the railway station and, on arrival at destination by rail, be taken by taxi to any place he cares to go.

The complete figures of the first two months of operation are interesting, particularly when it is considered that the heaviest passenger travel on the C. R. & I. C. has always been in the winter, when Iowa State University, at Iowa City, is in session. The figures follow:

Month	Year	Passengers	Revenue
June	1936	6,183	$2,434.91
June	1935	3,868	2,194.24
	Increase...	2,315	$240.67
		59.8%	10.9%
July	1936	7,454	$2,438.95
July	1935	3,570	1,973.54
	Increase...	3,884	$465.41
		108.8%	23.5%

The C. R. & I. C. operates between Cedar Rapids,

Iowa, and Iowa City, 27 miles, serving as a north and south connecting link between the east-west main lines of the Chicago & North Western on the north and the Chicago, Rock Island & Pacific on the south.

Cedar Rapids is a manufacturing and industrial city of some 60,000 population, while Iowa City is principally a college town of 20,000 inhabitants, augmented from September to June by the some 8,000 students at the University of Iowa. Except for these termini, there are only two towns along the line and these are both of less than 500 population, although the country traversed is rich agricultural land lying between the Cedar and Iowa rivers. The state tuberculosis sanitarium is situated on this line, about five miles north of Iowa City.

The C. R. & I. C. has always enjoyed a comparatively large freight business, having a favored situation as to industry location at Cedar Rapids and also operating through merchandise cars and other interline business in

The C. R. & I. C. Operates When the Adjacent Highway Is Closed

connection with the through railways previously mentioned. It was among the first railways to install an effective freight pick-up and delivery service some years ago. However, with the building of a hard-surfaced highway between Cedar Rapids and Iowa City, the passenger business began declining alarmingly, and this decline continued unabated until the new rates and services were installed.

The New Services

On June 2 of this year, the rates were reduced from 85 cents one way to 55 cents, and from $1.70 a round trip to $1.00 a round trip, with corresponding reductions for local service. At the same time, the number of trains was increased from 8 in each direction daily to 11, and the schedules were revised to provide for arrival and departure times which careful study indicated were most suitable to the passengers' convenience. At the same time, the schedules were made slightly faster. This has had the immediate result of bringing back local passengers to the railway, whereas before, local passenger traffic had been practically nonexistent.

Contracts With Taxi Companies

At the same time, the railway entered into contracts with the taxicab companies at Iowa City and Cedar Rapids for the pick-up and delivery of passengers within the corporate limits of these two cities. This provides for a maximum taxi haul of 2½ miles in the first city, and 5 miles in the second. However, in actual practice, it has been found that the average haul is not much more than half a mile. The tariff also provided that passengers from or to Oakdale could use the service at the termini in either direction, although taxi service is not provided at this intermediate point.

The mechanics of the service have purposely been made very simple for the passenger's convenience. All he has to do is to telephone the railway ticket office and a taxi calls for him. He is given the choice of using the taxi service at either or both places. Thus, tickets are sold without the taxi service, or with one or two taxi coupons on one way tickets, or from one to four taxi coupons on round trip tickets, each taxi coupon costing ten cents. For example, a passenger purchasing a round trip ticket and desiring taxi service in both directions in both Cedar Rapids and Iowa City, pays $1 for the rail haul, and 10 cents for each of the four taxi coupons, or a total of $1.40 for the round trip ticket, which is still 30 cents cheaper than the former round trip fare, which provided for no taxi service whatever.

The station at Cedar Rapids is in the downtown business district and in Iowa City it is close to many of the university buildings. For this reason, there are a number of instances where taxi service is not necessary. However, during July, 1936, 3,286 through tickets were sold, and, of these, 1,089 passengers, or 34 per cent, availed themselves of one or more of the taxi services provided. There is, in addition, a considerable interline business handled on through tickets. It is not possible as yet to issue taxi service coupons in connection with such through tickets. However, such passengers may and do avail themselves of the taxi service, being informed of this privilege by the ticket agents and conductors. It is also planned to extend this privilege to commutation and monthly tickets this fall when school starts and numbers of such tickets are in use.

Selling the Service

To sell the new service, an advertising campaign in the local newspapers has been begun, supplemented by a 15-minute weekly radio program from the Cedar Rapids broadcasting station. At the same time, much attention has been given to the proper explanation of the plan to the conductors and ticket agents, as a departure in railway service such as this has inevitably brought about numerous questions from the passengers.

The C. R. & I. C. station in Cedar Rapids also serves as the central bus station, and all bus tickets out of Cedar Rapids for all lines, as well as all airplane tickets, are sold there by the C. R. & I. C. clerks. Because of the proximity, the railway has been able to hire a number of university graduates as ticket clerks, and these men form a courteous and alert staff.

Since practically all of its competition came from the private automobile, the C. R. & I. C., in its sales campaign, has not hesitated to point out its advantages over the highway. For one thing, the railway assumes that the passenger is its liability even while riding in the

collection and delivery taxis, and has had the C. R. & I. C. named as an additional insurer. The highway between the two cities passes through rolling country and contains 63 curves. Truck traffic and reckless driving have contributed innumerable accidents along this road, whereas no passenger has been injured, even slightly, in a train accident on the C. R. & I. C. for more than 10 years. Also, the highway was blocked for weeks at a time during the severe weather of the past winter, whereas the railway suffered only slight interruptions.

With the excellent results already obtained during the season when passenger business is normally light, the officers of the C. R. & I. C. feel that the experiment has been most successful. They anticipate even greater success during the school year, and a campaign is already under way to secure the additional passenger traffic brought about by the football and basketball games, lectures, plays and exhibitions at the university.

New White "Dream Coach"

SEVERAL large manufacturers co-operated with the White Motor Company in producing the "Dream Coach" for exhibition at the Great Lakes Exposition in Cleveland, Ohio, this summer.

The coach was styled by Count de Sakhnoffsky, designer of articulated trains, airplanes, streamlined trucks and other forms of modern transportation, and, though unique in appearance, practical considerations were taken into account in the designing. The coach is air-conditioned by a Kelvinator unit, which permits the body to be completely insulated, with closed, double-glazed windows. It permits the use, also, of large safety-glass windows, providing unusual light and vision. The glass is markedly heavier, with a correspondingly increased safety factor, than could have been used in windows that had to be raised and lowered. A special type of reclining airplane seat, with both seat backs and cushion of a new type of sponge rubber, was developed for this coach. Its equipment also includes a radio, indirect lighting, a refreshment bar, divans and magazine racks.

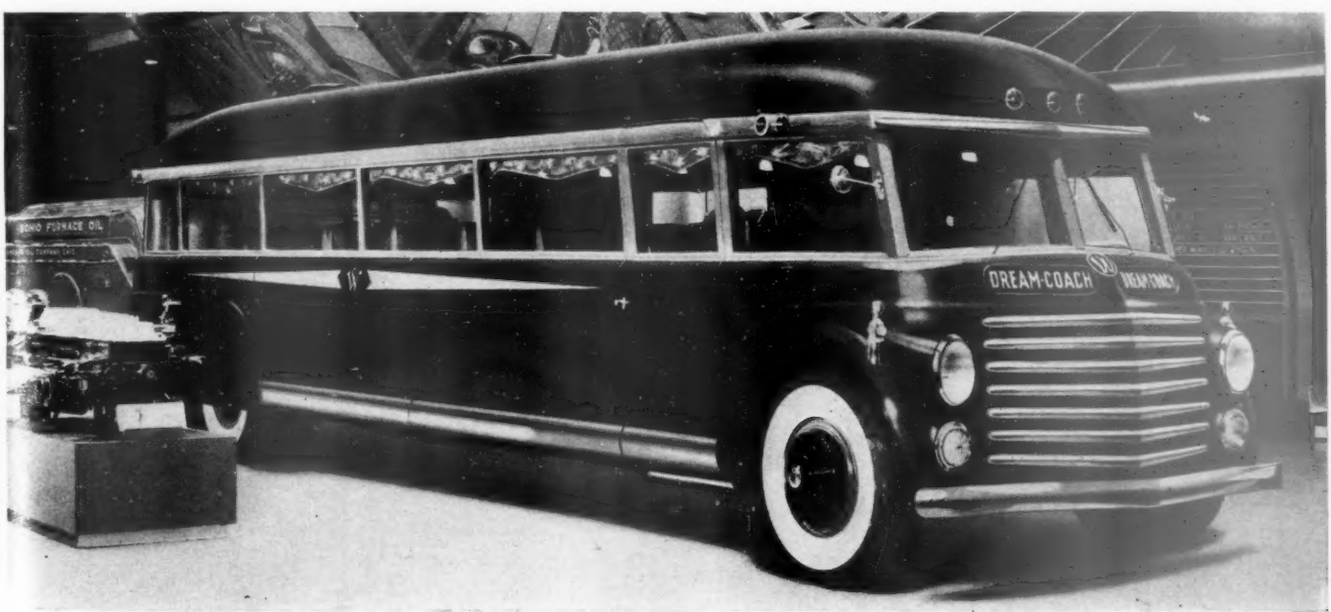
The power plant consists of a 12-cylinder, 180 h.p., pancake engine mounted under the floor. A five-speed transmission with helical gears in all speeds eliminates much of the usual motor noise. The "Dream Coach" is of the so-called integral design, in which the body and chassis are combined as a single unit, tending to increase safety and riding comfort.

Metropolitan Truck Area

A NUMBER of eastern railways have filed a protest with the Interstate Commerce Commission against the trucking area set up as comprising the district of metropolitan New York. Such districts have been set up for several of the larger cities, and

Most of the Surrounding Countryside Is Included in New York's Metropolitan Truck Area

trucks operating within the limits will be considered as city trucks and governed only by the regulations for such classification promulgated by the Motor Carrier Bureau. The New York area, as shown on the accom-



The "Dream Coach" on Display at the Cleveland Exposition

panying map, includes Staten Island, several counties in New Jersey, all of the Bronx and much of Westchester county, as well as the eastern half of Long Island. Theoretically, at least, hauls of up to 100 miles are possible within the limits of this area and still trucks engaging in such service would be classified as "city trucks."

New National Trailways Station

FOLLOWING the announced policy of station improvement made when the National Trailways was organized some months ago, a modern bus station has just been completed at the corner of Broadway and Lucas avenue, in St. Louis, Mo. This centrally located station will be used jointly by the Missouri Pacific Trailways, the Santa Fe Trailways and the Missouri, Kansas & Oklahoma Trailways, all member lines of the National Trailways System.

The interior floor covering is of decorative composition block, giving the appearance of tile. The lounges and chairs are finished in chromium, upholstered with green leather trimmed in black, and are of a modernistic design. Along the walls are numerous modernistic electric signs directing patrons to that section of the station where information, tickets, rest rooms, etc., can readily be reached. At the south side is installed a concession stand where soft drinks, candies, fruit, magazines, cigars and cigarettes are available. The ticket office and the baggage room are located in the northeast corner.

The exterior is finished with harmonizing buff brick to a point three feet above the base, which is of black glazed bricks. Along the Broadway side, extending north from the waiting room, is an archway which forms the gateway through which the motor coaches depart from the loading area, wherein six buses can be boarded at one time regardless of weather. Coaches enter the loading area from the Lucas avenue driveway and depart via Broadway.

Six Buses May Be Loaded Under Cover at the Same Time at the New Trailways Station in St. Louis

The Interior of the New Trailways Station in St. Louis Combines Modernity with Efficiency

The C. A. & S. Auto-Railer Is Used in a Wide Variety of Services

Auto-Railer in Revenue Service

Chicago, Attica & Southern uses rail-highway freight unit for a wide variety of services

IN May of this year, the Chicago, Attica & Southern put into active use the first Evans auto-railer to go into regular revenue freight service on any railway. After approximately five months operation, this unit has proved its worth in the service in which it is engaged It has consistently handled loads heavier than its rated capacity, has been used in a wide variety of work, and has given a high ratio of effective service.

The Chicago, Attica & Southern operates 135 miles of north and south main line in Indiana between West Melcher and Wellsboro, with connections with trunk lines every 15 or 20 miles, together with a 21-mile branch between Percy Junction and State Line Junction. By means of its connections, its comprises a portion of one of the through routes between St. Louis and Detroit and other Michigan points, and a considerable percentage of its traffic consists of freight which it handles as a bridge line between trunk line connections. Its principal revenues other than this are derived from grain shipped from elevators on its lines, with industries at the larger towns of Veedersburg and Attica, and the usual variety of inbound traffic for the farming communities it serves.

The railroad was a portion of the Chicago & Eastern Illinois, which secured authority for its abandonment 15 years ago. After remaining out of service for a year, the local demand for a renewal of railway freight service along the line became great, and it was taken over by local interests who have since operated it.

Auto-Railer Operations

The branch line referred to above and shown on the accompanying map, was known as the "sore thumb" prior to the advent of the auto-railer. There was relatively little through traffic over this branch and what traffic originated there was by no means constant. Accordingly, it was necessary to call a crew and make up a train whenever traffic was offered, frequently for only one or two cars and practically always for only a few hours service. Under the circumstances, the operations on the branch could not be other than expensive and slow. It is estimated that the auto-railer operations save $25 per day. Much of the traffic that originated at or was destined to stations along the branch, was therefore lost to highway competition, which could provide a greater flexibility of service.

Although the auto-railer frequently operates on the main line, it was for this branch line that it was chiefly intended, and it ties up for the night at Morocco, Ind., a station on the branch. The map shows the network of hard-surfaced roads in the vicinity of Morocco, over which this unit may operate in proceeding from the main line to the branch and vice versa, without having to follow the rail line south to Percy Junction, then north again.

Traffic Attracted

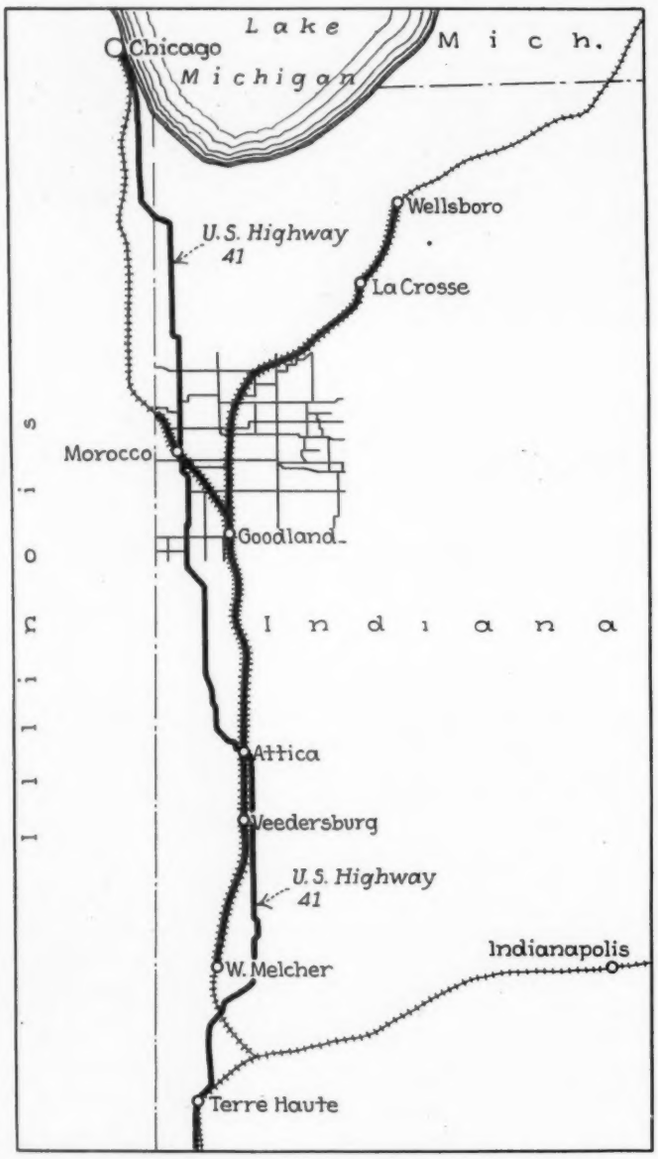
One of the immediate results of the greater flexibility of service was that the C. A. & S. began to secure cars of livestock from the stockyards at Brook, Ind., on the branch, which had hitherto moved by truck. At the same time, the auto-railer has proved valuable in replacing work trains on the rail renewal program now in progress on the main line north of Percy Junction.

The conductor's train records covering this unit form an interesting study. On July 28, for example, the unit operated 93 miles, 14 of which were on highways, and handled 579 gross tons for the day, or a total of 4,703

ton-miles, on 40 gal. of gas. This included the handling of the following cars:

Contents	Gross Tons	Miles
Fire Clay	82	23
Sand	91	13
Gasoline	52	10
Rails (3 cars)	181	27
Grain (2 cars)	148	13
Empty gondola	25	13

On August 1, the unit handled 824 gross tons, or 6,985 ton-miles, and made trips on the highway between the main line and the branch on four occasions during



Map Showing the Line of the C. A. & S. and the Highways Available to the Auto-Railer

the day. The tonnage handled and the miles were as follows:

Contents	Gross Tons	Miles
Sand (5 cars)	451	65
Rail (3 cars)	260	27
Gasoline	50	7
Castings	43	23
Empty	20	7

These mileages are typical of the service rendered by this unit, which has averaged some 12 hours per day actual service since it was installed.

Type of Unit

The specifications for the unit used in this service are as follows:

Chassis—14,125 lb. gross load

Wheel base—124 in. to first rear axle—178 in. to second rear axle (pneumatic wheels)—177 in. (flanged wheels

Engine—6 cylinder—428 cu. in. displacement—106 h.p. at 2600 r.p.m.—Torque 280 ft. lb. at 1200 r.p.m.

Traction—4 rear pneumatic wheels driving—dual axles—ratio 6.6

Pneumatic wheels—6 wheels—tires 32 in. x 6 in.—10 ply—high pressure

Brakes—6 wheel hydraulic, air actuated, foot pedal—emergency hand lever with ratchet lock—propeller shaft disc

Transmission—5 speed forward with under drive—1 speed reverse

Railway conversion—4 rubber-cushioned, steel flanged wheels (only pilot wheels). Pressure applied and wheels retracted by compressed air.

Couplers—A.A.R. full automatic—front and rear

Air line—Extensions, connections and controls

Body—van type

- Cab—driving compartment integral with body (Metropolitan type drive) doors each side
- Glass—shatter-proof
- Loading space
  - Length back of driver's partition—169 in.
  - Width—86 in.
  - Height—74 in.
- Construction
  - Sides all steel, slated inside
  - 48 in. wide side doors—overhead type—each side
  - Roof all steel—integral with body
  - Floor—1¼ in. oak, with steel skid straps
  - 2 seats driving compartment
  - Ventilation—roof type ventilators
  - Locks—in all doors
  - Grab handles and steps at all doors

Lights—outside—comply with regulations, both railway and highway

- Inside—1 dome light in freight and 1 dome light in driving compartment

Equipment

- Re-railer
- Re-railing mirror
- Re-railing lights
- Air whistle
- Compressor—12 cu. ft.
- Automatic air brake valves
- Tire inflation hose attached
- Battery—h.d., 6 volt, 150 amp. hour
- Generator—h.d., 6 volt, 600 watt
- Spare tire and wheel
- Windshield wipers—2 electric
- Fusee, Flag and torpedo boxes
- Tools and heavy duty jack
- Heater in driving compartment
- Spot light
- Fire extinguisher, 1½ qt. capacity
- Rear view mirror (outside)—2 furnished
- Bumpers—front and rear
- Governor
- Monograms, lettering and special painting
- Turning signal
- Emergency draw bar
- Signal circuit shunt
- Rear roof "headlight"

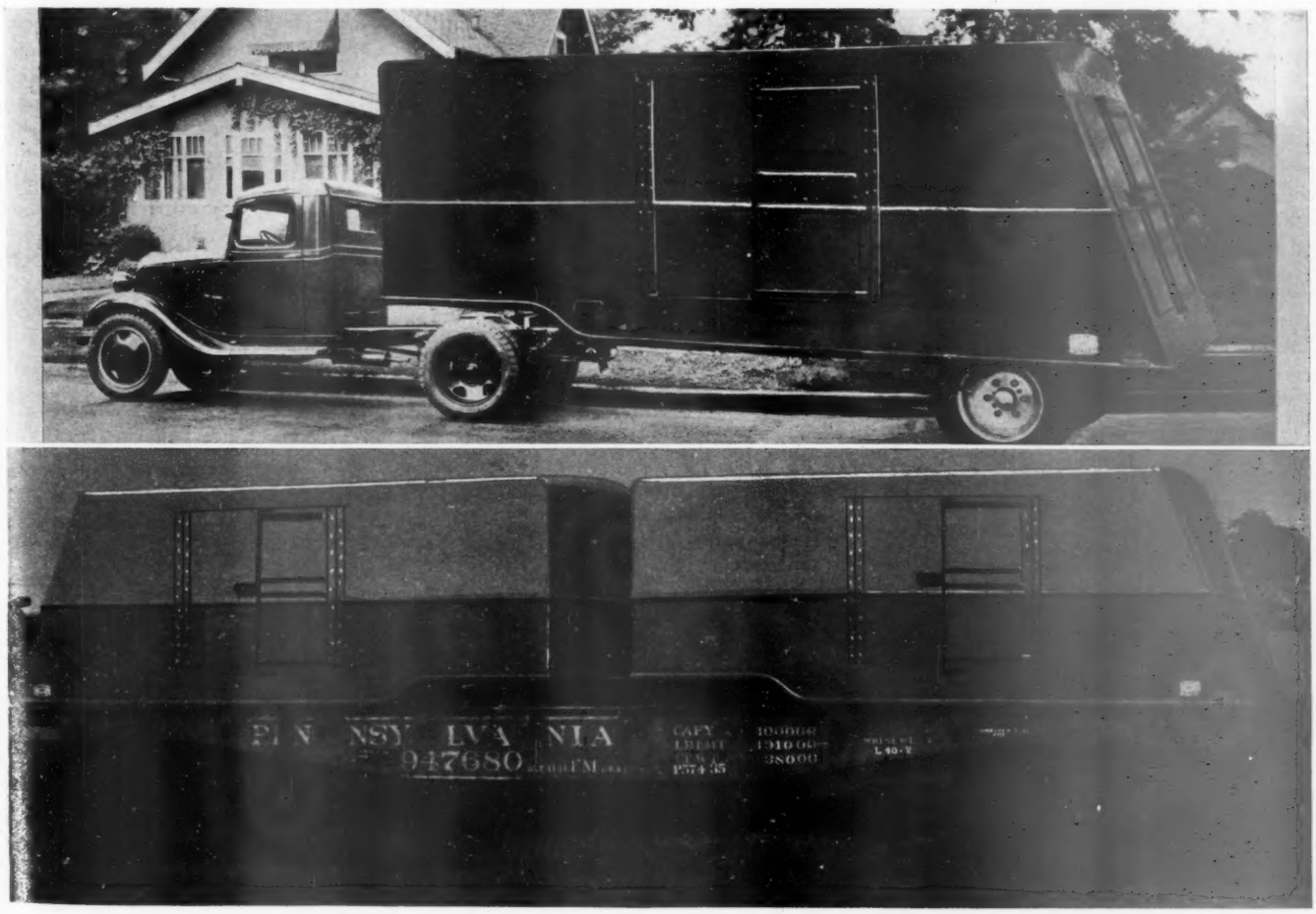
Budd Coaches for Iraq

LIGHT-WEIGHT stainless steel buses built on the principle of streamlined trains are to be placed in service on the Syrian desert. The Edward G. Budd Manufacturing Company has received an order from the Nairn Transport Company, Ltd., for two stainless steel bus trailers, the first of their kind, for service between Baghdad, in the British mandated territory of Iraq, and Damascus, Syria. Drawn by 150-horsepower Diesel tractors, to be built by the Van Dorn Iron Works of Cleveland, Ohio, they will make the 530-mile run over the open desert in 15 hours; heavy buses now require 35 hours. One bus will a first-class day coach with seats for 19 passengers, the other a sleeper with upper and lower berths for 14 passengers. Both will be fully air-conditioned. Installation of the air-conditioning equipment and the interior finishing will be done by Fitz-Gibbon & Crisp of Trenton, N. J. The entire unit will be 57½ ft. long. On the Syrian desert, over which the Nairn Company has been operating passenger vehicles for 14 years, there are no traffic problems and only one stop—Rutba Wells, an oasis midway the journey.

Freight Handling Device Tested

A DEMONSTRATION of the Cederstrom freight handling device was held on August 21 at the loading platform of the Chicago, Rock Island & Pacific at Minneapolis, Minn. This device consists of a semi-trailer having a hydraulic raising and lowering mechanism built integral with the trailer chassis, which permits the trailer and its load to be raised or lowered from position of its frame on the ground to normal height of a highway vehicle. It is intended for rail-trailer haulage for co-ordinating railroad and motor truck freight transportation.

The demonstration consisted of loading and unloading a full sized unit on a standard railroad flat car, using a 20 ft. chassis unit loaded with two 5-ton I-beams as a load, the body being omitted so as to observe its mechanical operation. A 50 ft. standard railway flat car would handle two of these units in actual rail operation. The tractor was a 1½ ton truck with a standard fifth wheel. The tractor hauled the trailer unit from the city street on to the car level side platform. The trailer was loaded on a standard railroad flat car by the tractor truck in the same manner as parking any semi-trailer parallel to a street curb, that is by spotting the trailer and then backing into its proper position on the car with the truck. When in this proper position the hydraulic props were lowered by power from the power take-off on the tractor and power props were extended to take the trailer weight entirely off the rear of the truck. The fifth wheel was then uncoupled and the tractor driven on to the loading platform at right angles to the trailer. The trailer control valve was then opened and trailer with its load settled on an even keel to its position as a container resting on its skids on the car platform. Just before reaching this full down position and when the trailer was about one foot off the platform, both ends of chains attached to trailer through eyes in snubbing screws were hooked through two car stake pockets on each side of the railway car, which anchored and locked the trailer to the



The Cederstrom Container on the Highway and on Rails

flat car by the one-foot final downward travel of the trailer with its load.

To unload the unit from a flat car this cycle of loading was reversed, the tractor truck on a car level side platform applying power from the power take-off to the hydraulic trailer mechanism, raising the trailer to a height to unloosen the snubbing chains and then continuing to raise the trailer and its load to its normal height as a trailer unit, with the front end of the semi-trailer slightly higher than the lower fifth wheel of the tractor truck. The tractor truck backed under the upper fifth wheel pin, at right angles to the trailer; the front end of the trailer was lowered by opening the trailer control valve to couple with the lower fifth wheel on the tractor, landing gear pistons were raised by means of a hand crank and the trailer hauled from the flat car on to the side loading platform and down the ramp into the street.

Briefs Filed with I.C.C. on C. and D. Service

VOLUMINOUS briefs in support of and in opposition to the plan of pick-up and delivery service proposed by the eastern railroads have been filed with the Interstate Commerce Commission in advance of the oral argument to be heard by the entire membership of the commission beginning on October 1 in the proceeding of investigation instituted by the commission when it suspended the eastern roads' tariffs.

Counsel for the eastern roads in their brief set forth among other things, that they are almost the only carriers in the United States to-day which do not provide a universal pick-up and delivery service for less-than-carload freight, and an allowance to shippers and consignees who prefer to furnish the service for themselves. Their competitors by highway and water, they said, quite generally provide such service and there can be no real question as to the public demand for it or as to the advantages to the public.

"The experience of railroads affording pick-up and delivery, even where on a restricted basis," the brief said in conclusion, "demonstrates the stimulating effect thereof upon their less-carload tonnages and revenues, and that the service can be furnished at station rates with no impairment of revenues, but on the contrary with improved revenue results. There is no occasion for the commission to be concerned with intimations of rate reductions by highway carriers. The commission has ample power under Parts I and II of the interstate commerce act to protect the situation and to insure the carrying out of the Congressional policy to foster both rail and truck transportation under sound and economic conditions. These respondents submit that what is here proposed is a true co-ordination of rail and truck operation which should be approved in the public interest."

The American Trucking Associations, Inc., the principal opponent of the plan, on the other hand asserted in its brief that the tariffs under consideration stood unjustified because "the service proposed to be performed under them will be on a basis which is proved and admitted to be below its proportionate cost, and the respondents have not only failed to meet the jurisdictional requirements imposed by Part II (motor carrier act) but openly challenge jurisdiction in that part. It was contended not only that the service proposed is subject to the provisions of Part II and that the railroads have proposed to make no attempt to comply with the requirements of the act, but that they propose "to carry out and donate to the shipping public a service conservatively estimated to cost them at least $15,000,000 as a direct expenditure." In this and other assertions as to the cost to the railroads the trucking association persistently ignored testimony of railroad officers at the hearings as to the offsetting economies to be derived from the handling of their less-carload tonnage in a more economical way and in greater volume.

The Merchants' Truckmen's Bureau of New York also opposed the pick-up and delivery plan, asserting that if the railroads are to perform such service they should do so at rates higher than their station-to-station rates by amounts reflecting the additional costs and the added value to the shipper. This brief also contended that any allowance to shippers at New York should be higher than that of 5 cents per hundred pounds proposed and should approximate the cost of trucking. The Cartage Exchange of Chicago took the position that the susended tariffs and present practices are unlawful because the railroads have not complied with the motor carrier act.

The Illinois Freight Association lines defended the pick-up and delivery service they had established and contended that the railroads clearly have the right to make the allowances to shippers while fairness to shippers compels them to do so. They added that the record clearly shows that the allowances are in no respect excessive.

Speaking for shippers, the Chicago Association of Commerce in its brief submitted that the record fails to show any evidence of unlawfulness in the provisions for collection and delivery service and that, on the other hand, the action of the railroads in providing for this service is in keeping with the encouragement and admonition of the commission that they should improve their services and reduce their costs to enable them to meet new forms of competition and the needs of the public. The Merchants' Association of New York and the Shippers' Conference of Greater New York also were of the opinion that the railroads should be permitted to extend their service between the shippers' and the consignees' places of business so that they might compete with highway operators on even terms. With regard to the terminal allowance of 5 cents they took no position except to oppose any discrimination against shippers and receivers in official classification territory which would result if the allowance were made in the South and in the West but not in eastern territory.

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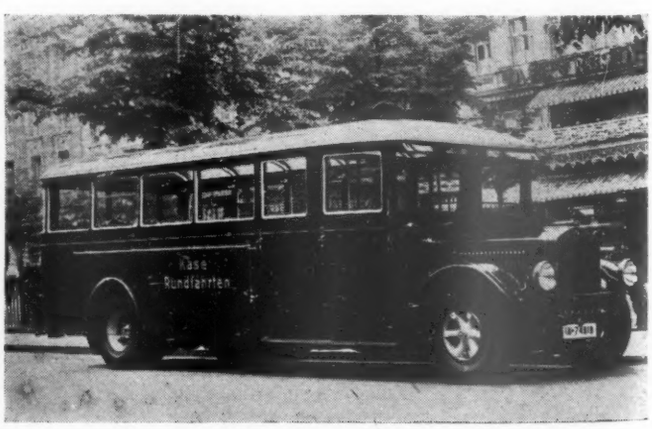

Observation Bus, with Glass Roof, Operated by the German Railroads

Roadmasters Held Profitable Convention at Chicago

(*Continued from page 442*)

mended that new foremen be selected from the ranks of the laborers, and the supervisors from the ranks of the foremen. It was also recommended that a differential in pay be established for laborers, giving recognition to their ability and the length of their service in the organization.

Laborers must be trained in such a manner as to provide an adequate supply of competent men from which new foremen may be selected when required. This training must be done primarily by the section foremen. In this connection the committee stressed the increasing importance of thoroughly trained forces arising from the operation of high speed trains. It was recommended that each foreman should have at least one man in his organization who is capable of handling a foreman's position if the occasion should arise. In this manner a supply of trained men is created from which vacancies among the foremen may be filled.

Selecting Foremen

The committee recommended that foremen be selected in accordance with their ability, and with some consideration to seniority, but added that advancement solely upon the basis of seniority indicates a lack of courage or good judgment by the official staff.

Discussion

The discussion of this report centered largely on the advisability of an increase in the wage rate for men of longer experience or for those laborers who have been selected for special training to prepare them for promotion to foremen, a number of those present favoring this plan while others reported unsatisfactory experience with the plan on the ground that it resulted in a higher rate of pay for men who were less efficient than some who were paid a lower rate solely because of shorter service.

700 "Fans" on Excursion

(*Continued from page 444*)

D. & H., through the Schoharie valley and the Helderberg mountains. One of the trains, to the delight of the passengers, was pulled by one of the D. & H. "600" class Pacifics, the appearance of which has been "Anglicized." At Albany the trains were switched to the tracks of the New York Central for the return trip to New York, 142 miles.

Each of the trains was made of 10 cars—7 coaches, 2 dining cars and a Pullman observation car. One of the dining cars sold table d'hote meals (lunch for 75 cents and dinner for $1) and the other dealt exclusively in sandwiches and light refreshments. Waiters also went through the coaches selling sandwiches, fruit and coffee.

Mayor Heiselman of Kingston greeted the party at that city and escorted a committee of the officers of the railroad hobby clubs to the Old Senate House and other points of interest in Kingston, which was the first capital of New York State. This trip was made while the engines were being changed at Kingston station.

A number of pamphlets and other descriptive material was given each passenger describing in detail the railroad, scenic and historical associations of the territory traversed. Among these was a 20-page illustrated pamphlet which, in addition to locomotive pictures, contained also detailed maps and profiles. Prospective patrons of the excursion received a printed invitation issued in the names of Presidents Williamson of the New York Central and Loree of the Delaware & Hudson. In charge of the excursion for the Central was W. T. Gaynor, assistant advertising manager, and for the D. & H., W. J. Coughtry, recorder. Officers and employees of both companies accompanied the trip, having volunteered to act as guides, as did members of the shop force at Oneonta.

Odds and Ends . . .

Beauty Queen Stewardesses

Dorothy Whitt and Ruby Williams, both winners in beauty contests held in connection with the 1936 Railroad Week, are now stewardesses on the Chicago & North Western "400" trains.

Twins

John Hunter, mechanic for the Boston & Maine at Boston, claims the railway twins record. On May 13, for the second time within three years, twin boys were born to the Hunters.

How to Catch a Train?

It is illegal in Alabama to sprinkle salt on railroad tracks, which seems a queer way to catch a train anyway.—Boston Transcript.

Centennial

When the Canadian National celebated its one hundredth birthday on July 21, E. J. W. Pangborn, retired engineman for the Southern Pacific, was an honored guest. In fact, he was at the throttle of the tiny "Dorchester," the original locomotive that ran on the Champlain & St. Lawrence a hundred years ago. Mr. Pangborn was given the honor because his grandfather was the first engineman on the C. & St. L., and actually drove the "Dorchester" for many years.

Grand Old Man

J. A. Small, vice-president, Southern Pacific of Mexico, calls our attention to the oldest railway employee in America. John McPherson, born in Scotland on January 4, 1836, is in his 101st year, but is still employed as a gardener for the S. P. of Mexico at Guaymas. John started railroading in Scotland in 1852 and emigrated to the United States in 1860. He served in the northern navy during the civil war, but "was not particularly interested in either side." He entered the service of the S. P. at the age of 48 as track foreman, and has a service record of 52 years with that company. John married rather late in life, at the age of 45. Nonetheless, he is the father of 23 children, the oldest 54 and the youngest 2½ years old.

The "Sam Hill"

The locomotive that pulls the Lincoln funeral train at the Great Lakes Exposition in Cleveland, Ohio, is in itself an object of considerable historical interest. This engine, the "Sam Hill," pulled Lincoln's train on the occasion of his visit to Cleveland in 1861. Having been built only the year before, it remained in main line service for some time thereafter, but was finally "sold down the river." Then its history was forgotten until Henry Ford, in his search for early Americana, gave orders that it be found. Eventually, his agents discovered it in a lumber yard at Satillo, Ga., still in switching service, but sadly run down. It was taken to Detroit, polished and partially rebuilt. Now, with its wood-burning stack, brass covered cylinders and brass capped steam and sand domes, it presents an interesting relic of the vanished glories of railroading in the sixties and seventies.

NEWS

Santa Fe Organizes for Public Relations Work

To cement friendly relations now existing, to build and carry forward new friendships, and to foster and preserve Santa Fe traditions, is the function of the newly created public relations department of the Atchison, Topeka & Santa Fe, according to M. L. Lyles, assistant to the president, in charge of public relations, in an address before the Business Editors Association of Chicago on September 21. "Our two major concerns," he said, "deal with our own employees and their co-operation with one another and with the public—our freight and passenger customers. As a first step in the development of our program we have established public relations offices in Chicago, Topeka, Kan., Galveston, Tex., Amarillo, Los Angeles, Cal., and San Francisco. The personnel of our staff consists of a mixture of experienced railroad operating and traffic officers and trained 'working' newspaper men, these on-line officers being called special representatives. They will keep in close personal contact with our various officers and employees and through them and in other ways with each publication in that territory.

"To determine the public's attitude toward it the Santa Fe is conducting a survey covering the Santa Fe (a) as an institution, (b) as a passenger carrier, and (c) as a freight carrier. The results will reveal the problems which must be considered to build up a proper understanding of the carrier.

"As no sound and effective public relations work can be carried on without the active co-operation of the entire personnel, we expect to enlist the active support of all employees in this work. They will be furnished from time to time information respecting the Santa Fe and the railroads as a whole, including data describing the work of each department of the Santa Fe, and other material of a helpful nature. With this procedure employees will be able to discuss the Santa Fe and other railroads intelligently. As a preliminary step in this direction, we are conducting at the present time a slogan contest among Santa Fe employees and offering cash prizes to the employee or member of his family who submits the most appropriate slogan typifying Santa Fe service and the Santa Fe spirit.

"We are also developing slide film sound pictures, which will carry our message to our employees, and to the public through the media of chambers of commerce, the various service clubs, parent-teacher associations, and other social and civic bodies.

"A Santa Fe Speakers' Bureau is being organized, which will co-operate with various organizations in the territory served, by furnishing speakers and material suitable for their meetings.

"We are urging all employees who have memberships in chambers of commerce, luncheon clubs and other organizations to take a more active interest in these associations."

Railway Business Association Meeting November 5

The twenty-eighth annual dinner of the Railway Business Association will be held at the Commodore Hotel, New York, on November 5. An attendance of approximately 1,600 members and railway officers is anticipated.

New York Railroad Club Meeting October 16

The first fall meeting of the New York Railroad Club will be held on Friday evening, October 16, at 7:45 p.m. at the club's usual meeting place—the auditorium of the Engineering Societies building, 29 West 39th street, New York. The program for this meeting will be announced later.

N. I. T. League in New York November 19

The National Industrial Traffic League will hold its annual meeting on November 19 and 20 at the Pennsylvania hotel, New York. This year, the usual evening banquet will be replaced by a luncheon (November 19) to which railway and industrial traffic representatives will be invited.

Railroad Enthusiasts

The New York Division, Railroad Enthusiasts, Inc., is sponsoring for Sunday, October 4, an excursion trip on the Erie from New York to that road's shops at Susquehanna, Pa. A special excursion rate of $3 for the round trip of 385 mi. has been arranged, and special cars for the group will be attached to the Erie Limited.

Stoker Hearings Resumed

Hearings were resumed before Director Bartel of the Interstate Commerce Commission's Bureau of Service at Washington on September 21 in the complaint case in which the Brotherhood of Locomotive Firemen and Enginemen is asking the commission to require the railroads to equip their locomotives with automatic stokers. Railroad officials who had testified at previous sessions were cross-examined by counsel for the brotherhood.

Master Boiler Makers Meet at Chicago

The twenty-third annual meeting of the Master Boiler Makers' Association, held at the Hotel Sherman, Chicago, September 16 and 17, was attended by about 175 members of the association and guests. At the business meeting a year ago, the first after a lapse of five years, the association undertook the task of rehabilitating the organization. This year, the results of this effort were apparent in the increased interest and backing of the principal railroads of the country, practically everyone of which was represented.

The by-laws of the association have been revised in a manner to make possible the most efficient handling of association affairs in the future. Henceforth, the officers to be elected will include a president, secretary-treasurer and an executive board of nine members. This board will elect one of its members as vice-president of the association, who will also serve as chairman of the board. To be eligible for the office of president or vice-president, a member must have had at least one year's experience on the executive board.

One of the principal features of the meeting was an address on the aims of the Bureau of Locomotive Inspection, which was delivered by John B. Brown, assistant chief inspector of the bureau. A special paper, contributed by the research committee of the International Acetylene Association, on the subject "Applications of Oxy-Acetylene Welding and Cutting in Locomotive Boiler Upkeep and Repairs," was presented by the chairman of the committee, C. W. Obert.

Special committee reports on the following subjects were presented and discussed widely by the membership:

"Boiler and Tender Pitting and Corrosion"; J. L. Callahan, special representative, National Aluminate Corporation (formerly general boiler inspector, Chicago Great Western), chairman.

"Proper Brick Arch Setting in Locomotive Fireboxes"; E. E. Owens, general boiler inspector, Union Pacific, chairman.

"Autogenous Welding as Applied to Locomotive Boilers and Tenders"; Albert F. Stiglmeier, boiler foreman, West Albany Locomotive Shops, New York Central, chairman.

"Proper Thickness of Front Tube Sheets"; Walter R. Hedeman, assistant mechanical engineer, Baltimore & Ohio, chairman.

"Proper Methods of Applying All Types of Staybolts to All Types of Boilers"; Leonard C. Ruber, superintendent boiler

department, Baldwin Locomotive Works, chairman.

"Improvements in Locomotive Front Ends"; J. M. Stoner, supervisor of boilers, New York Central, Lines West, chairman.

The annual election resulted in the following officers being selected for the ensuing year—President: M. V. Milton, chief boiler inspector, Canadian National, Toronto, Ont.; Secretary-Treasurer: Albert F. Stiglmeier, general foreman boiler maker, New York Central, West Albany Shop, Albany, N. Y.

Executive Board, *one year*: George L. Young, foreman boiler maker, Reading Company, Reading, Pa.; C. W. Buffington, general master boiler maker, Chesapeake & Ohio, Richmond, Va.; A. W. Novak, general boiler inspector, Chicago, Milwaukee, St. Paul & Pacific, Minneapolis, Minn. *Two years*: M. V. Milton, chief boiler inspector, Canadian National, Toronto, Ont.; Charles J. Klein, locomotive inspector, Bureau of Locomotive Inspection, Albany, N. Y.; Sigurd Christopherson, supervisor of boiler inspection and maintenance, New York, New Haven & Hartford, East Milton, Mass. *Three years*: William N. Moore, general boiler foreman, Pere Marquette, Grand Rapids, Mich.; Carl A. Harper, general boiler inspector, Cleveland, Cincinnati, Chicago & St. Louis, Indianapolis, Ind.; E. C. Umlauf, supervisor of boilers, Erie, Susquehanna, Pa.

I. C. C. Hearing on Motor Safety Regulations

Commissioners Eastman, Lee, and Caskie, of Division 5 of the Interstate Commerce Commission, held a hearing at Washington on September 16, 17, and 18 on the proposed regulations tentatively drafted by the commission's Bureau of Motor Carriers as to qualifications of employees and safety of operation and equipment of motor carriers.

Enginemen and Trainmen of Two Roads On Strike

A strike of enginemen, firemen, conductors and trainmen was called by the Big Four brotherhoods on the Louisiana, Arkansas & Texas and the Louisiana & Arkansas on September 19, to force the railroads to reinstate agreements abrogated in June, 1933, recognizing standard rates of pay, rules and working conditions. As only 10 per cent of the employees of these roads walked out, train service continued to operate on schedule.

New York Central Trains Removed from Syracuse Streets

The opening on September 24 of the New York Central's new elevated line, five miles long, through Syracuse, N. Y., marked the culmination of six years' work on this project for the complete removal of the main line tracks of the N. Y. C. and West Shore from the streets of that city. The project, among other features, involved the elimination of 62 grade crossings and the construction of a new passenger station.

The last train into the old station was the Empire State Express, westbound, on September 24 and the first train into the new station was the eastbound Empire State Express. This train has been operating through the streets of Syracuse for the past 43 years. The city of Syracuse took advantage of the occasion to stage a three-day pageant depicting the story of Syracuse and its relation to transportation. This pageant, which was held on September 24, 25 and 26, was staged under the direction of Edward Hungerford.

Southwestern Roads Ask Higher Divisions

The southwestern railroads have filed with the Interstate Commerce Commission a petition for a reconsideration and reargument of the case in which the commission recently prescribed a new basis of divisions of joint class and commodity through rates between the eastern and southwestern lines. They said that the basis prescribed will result in grave injustice to the southwestern lines and ask for a materially higher basis for the future.

August Locomotive Shipments

August shipments of railroad locomotives, as reported by the country's principal manufacturing plants to the United States Department of Commerce, totaled 18 locomotives—16 steam and 2 Diesel-electrics—as compared with six—one electric, three Diesel-electrics and two steam—in August, 1935. Unfilled orders at the end of August totaled 117 locomotives, including 71 steam, 20 electric and 26 Diesel-electric, as compared with unfilled orders for 40, including 14 steam, 21 electric and five Diesel-electric, as of August 31, 1935.

Wabash Speeds Up St. Louis Train

The Wabash, on September 27, will place its St. Louis Special on a schedule of 4 hr. 55 min. between Chicago and Delmar station, St. Louis, Mo., and 5 hr. 15 min. between Chicago and the St. Louis Union station. The train will leave Chicago at 4:30 p.m. and will arrive at Delmar station at 9:25 p.m. and St. Louis Union station at 9:45 p.m. Returning, it will not operate via the Delmar station, but will leave the St. Louis Union station at 8:50 a.m. and arrive in Chicago at 1:45 p.m.

The Sam Houston Zephyr

The Chicago, Burlington & Quincy is to place the "Sam Houston Zephyr," one of its three-car, streamlined trains, in service on the Burlington-Rock Island between Houston, Tex., and Fort Worth, beginning on October 1. The train will make a round trip daily, leaving Houston at 7:55 a.m., and arriving at Dallas, 250 miles, at 12:05 p.m. (60 m.p.h.), and at Fort Worth, 283 miles, at 12:55 p.m. Returning, it will leave Fort Worth at 6 p.m., arrive in Dallas at 7 p.m. and at Houston at 11:10 p.m.

Coal Association Predicts Possible Car Shortage

Possibility of a "material advance" in coal prices if the trend of increased coal production keeps up was forecast in a report issued by the National Coal Association, with a prediction that if this occurs it will be the result of a shortage of coal cars. "The railroads, while making desperate efforts to meet the demands for coal cars in all sections, are finding it quite difficult to do this in some localities," the statement said. "Certain types of cars are not everywhere available in sufficient quantities to meet the demand."

Wage Conference in Canada Adjourns

Eighty union officers and general chairmen representing approximately 130,000 organized railway employees in Canada last week adjourned at Montreal for an indefinite period, following three days of discussion of a proposed new wage agreement with the railways. Following the meeting, Howard Chase, assistant grand chief for Canada of the Brotherhood of Locomotive Engineers, who has acted as spokesman at the meetings, declared that no statement was available for the press.

It was reported, however, that the men were in conference with the railway managements. The basis of the deliberations of the employees' representatives has been the restoration of pay cuts made since the beginning of the depression. Wages have been reduced in all by about 15 per cent, but following negotiations held more than a year ago between the unions and managements, five per cent of the 15 per cent reduction was restored. The present deliberations aim at obtaining a restoration of the balance of 10 per cent.

Air Express Revenues Increase

Air express revenues of the Railway Express Agency for the first six months of 1936 were 75 per cent greater than revenues of the contract air lines during the first half of last year. Substantial gains in the total number of shipments were also reported in a statement issued recently by the Air Express Division of R. E. A. Shipments of advertising materials showed the largest gain, while other shipments in large numbers were checks between correspondent banks, films and news-reel negatives, women's clothing, machinery parts, newspapers and news photographs.

Seek Curb on Supreme Court to Guard Pension Act

A resolution, designed to prevent the supreme court from passing on constitutional questions, was adopted by members of the Railroad Employees' National Pension Association, at a meeting in Chicago on September 16. The association's executive committee was directed by the resolution to prepare a new pension bill, in the event the present railroad retirement act is declared unconstitutional, which would include the following:

"The constitutionality of this act having been declared by the competent authority of congress and the president of the United States at the time of its passage, shall only be questioned thereafter by the congress itself, and the people of the United States in their sovereign capacity as voters.

"Any executive or judicial officer who in his official capacity denies the constitutionality of this act shall vacate his office. No judge of an inferior federal court shall

permit the question of constitutionality of this act to be raised in the court over which he presides, and the United States supreme court shall have no appellate power to pass upon such question."

Pennsylvania Adds New Train

The Pennsylvania, on September 27, will place in service a new train, the "Indiana Arrow," between Chicago and Kokomo, Ind., Anderson, Newcastle, Marion and Hartford City. At Logansport, the "Indiana Arrow" will split three ways, one train going to Bradford, one to Richmond and the third via Indianapolis to Louisville. The train will leave Chicago at 4:05 p.m., central time, and will arrive at Logansport at 6:12 p.m., Bradford at 9:45 p.m., Richmond at 8:20 p.m., and Louisville at 11:05 p.m. Returning, the train will leave Bradford at 4:15 p.m., Richmond at 3:40 p.m., Louisville at 1 p.m. and Logansport at 5:53 p.m. and will arrive in Chicago at 8 p.m.

Maple Leaf Time Reduced

The Grand Trunk-Canadian National, on September 27, will reduce the running time of the "Maple Leaf" from Chicago to Toronto, Ont., 1 hr. 15 min. The train will leave Chicago at 10:30 a.m., central time, instead of 9:15 a.m., and will arrive in Toronto at 10:35 p.m., eastern time, as at present.

A new train will also be placed in operation between Chicago and Toronto via Stratford, Ont. It will leave Chicago at 9 a.m., central time, and will arrive in Toronto at 10:35 p.m., eastern time. A second train, carrying through cars from New York and Philadelphia, will leave Port Huron, Mich., at 10:30 a.m., eastern time, and will arrive in Chicago at 4:30 p.m., central time.

R. & L. Historical Society

The New York Chapter of the Railway & Locomotive Historical Society will hold its first meeting of its 1935-1936 season in the auditorium of the Engineering Societies Building, 29 West 39th Street, New York, on Oct. 9. T. J. McDermott, mechanical engineer, and J. J. Laudig, research engineer, of the Delaware, Lackawanna & Western, will discuss, respectively, the development of Lackawanna motive power and the company's research work.

The Chapter has arranged for a party to go by special train over the Lehigh Valley to Sayre, Pa., on Oct. 25, to inspect the Lehigh's locomotive and car shops there. The train will leave the Jersey City terminal at 9.15 a.m., returning at 10.45 p.m. The fare will be $5.

National Safety Council Meeting

The twenty-fifth National Safety Congress and Exposition of the National Safety Council will be held at Atlantic City, N. J., on October 5 to 9. At the Steam Railroad Section session to be held on Wednesday morning, October 7, at the Ambassador Hotel, the following papers will be delivered: "Safety in Railroad Construction and Maintenance from the Viewpoint of a Chief Engineer," by C. H. Paris, chief engineer, Chicago & Illinois Midland; "Safety on the Railroads and Its Relation to Community Safety" by A. V. Rohweder, superintendent of safety and welfare, Duluth, Missabe & Northern; "Management's Responsibility for Safety Work on the Railroad" by Ralph Budd, president, Chicago, Burlington & Quincy; "Safety Today on American Railroads as Viewed by the Interstate Commerce Commission" by Commissioner Frank McManamy.

W. W. Wood, superintendent of safety and welfare of the Baltimore & Ohio and chairman of the Section, will preside.

Club Meetings

The Northwestern Car Men's Association (St. Paul, Minn.) will hold its annual meeting and election of officers at the Midway Club Rooms, 1957 University avenue, St. Paul, on Monday evening, October 5.

The Car Foremen's Association of Omaha will hold its next meeting at the Burlington station, Omaha, Neb., on Thursday, October 8, at 1:30 p.m. F. M. Rezner, C. B. & Q., will present a paper on preparing of cars for flour loading.

The Canadian Railway Club will hold its next meeting at the Windsor Hotel, Montreal, on Wednesday evening, October 14. C. E. R. Sherrington, secretary, Railway Research Service, London, Eng., will present a paper on "Contemporary Railway Conditions and Program—British Isles."

The Toronto (Ont.) Railway Club will hold its next meeting at the Royal York Hotel, Toronto, on September 28. H. G. Clarke, Engineer M. W., Delaware & Hudson, will speak on "Track."

Roads Report Net Deficit Of $23,756,134 For Six Months

Class I railroads for the first six months of this year reported a net deficit of $23,756,134, as compared with a net deficit

SELECTED INCOME AND BALANCE-SHEET ITEMS OF CLASS I STEAM RAILWAYS

Compiled from 138 reports (Form IBS) representing 144 steam railways
TOTALS FOR THE UNITED STATES (ALL REGIONS)

For the month of June 1936	For the month of June 1935	*Income Items*	For the six months of 1936	For the six months of 1935
$50,312,580	$34,102,698	1. Net railway operating income	$238,243,936	$194,776,453
14,615,582	16,200,992	2. Other income	71,514,195	78,479,495
64,928,162	50,303,690	3. Total income	309,758,131	273,255,948
1,792,467	1,549,622	4. Miscellaneous deductions from income	9,624,338	8,836,639
63,135,695	48,754,068	5. Income available for fixed charges	300,133,793	264,419,309
		6. Fixed charges:		
11,168,386	11,177,718	6-01. Rent for leased roads	67,052,625	66,594,119
41,839,311	41,713,831	6-02. Interest deductions	249,486,725	252,051,503
225,707	216,700	6-03. Other deductions	1,318,886	1,305,886
53,233,404	53,108,249	6-04. Total fixed charges	317,858,236	319,951,508
9,902,291	* 4,354,181	7. Income after fixed charges	* 17,724,443	* 55,532,199
999,832	999,831	8. Contingent charges	6,031,691	6,016,690
8,902,459	* 5,354,012	9. Net income†	* 23,756,134	* 61,548,889
16,085,104	16,301,419	10. Depreciation (Way and Structures, and Equipment)	96,779,537	97,529,073
2,838,533	1,298,704	11. Federal income taxes	11,506,782	7,945,066
		12. Dividend appropriations:		
9,408,940	9,118,053	12-01. On common stock	37,496,595	46,685,339
473,500	281,420	12-02. On preferred stock	13,202,911	8,126,902

Selected Asset Items	Balance at end of June 1936	Balance at end of June 1935
13. Investments in stocks, bonds, etc., other than those of affiliated companies (Total, Account 707)	$687,858,373	$738,204,562
14. Cash	$417,822,431	$379,874,552
15. Demand loans and deposits	3,801,151	11,200,532
16. Time drafts and deposits	32,368,706	24,715,593
17. Special deposits	128,647,760	77,407,063
18. Loans and bills receivable	2,726,699	4,100,782
19. Traffic and car-service balances receivable	61,349,852	56,449,962
20. Net balance receivable from agents and conductors	50,875,534	44,760,595
21. Miscellaneous accounts receivable	142,150,010	137,820,974
22. Materials and supplies	297,537,842	301,923,076
23. Interest and dividends receivable	27,247,270	33,338,659
24. Rents receivable	2,308,553	2,243,177
25. Other current assets	6,351,289	4,502,775
26. Total current assets (items 14 to 25)	$1,173,187,097	$1,078,337,740
Selected Liability Items		
27. Funded debt maturing within 6 months‡	$138,929,438	$160,255,348
28. Loans and bills payable§	$244,724,766	$342,192,107
29. Traffic and car-service balances payable	80,019,353	72,301,371
30. Audited accounts and wages payable	237,459,390	224,156,713
31. Miscellaneous accounts payable	97,459,081	64,439,422
32. Interest matured unpaid	498,686,834	381,174,617
33. Dividends matured unpaid	11,409,201	13,915,655
34. Funded debt matured unpaid	462,312,209	332,215,336
35. Unmatured dividends declared	10,763,360	10,940,942
36. Unmatured interest accrued	92,011,959	92,543,135
37. Unmatured rents accrued	25,235,795	23,367,198
38. Other current liabilities	25,753,467	23,268,507
39. Total current liabilities (items 28 to 38)	$1,785,835,415	$1,580,515,003
40. Tax liability (Account 771):		
40-01. U. S. Government taxes	$61,112,360	$34,800,427
40-02. Other than U. S. Government taxes	135,995,580	137,487,517

† The net income as reported includes charges of $1,472,056 for June, 1936, and $8,620,018 for the six months of 1936 on account of accruals for excise taxes levied under the Social Security Act of 1935; also $3,704,605 for June, 1936, and $15,772,458 for the six months of 1936 under the requirements of an Act approved August 29, 1935, levying an excise tax upon carriers and an income tax upon their employees, and for other purposes. (Public No. 400, 74th Congress.) The net income for June, 1935, includes credits of $1,087,941 and for the six months of 1935 credits of $5,517,768, on account of reversal of charges previously made for liability under the Railroad Retirement Act of 1934.

‡ Includes payments which will become due on account of principal of long-term debt (other than that in Account 764, Funded debt matured unpaid) within six months after close of month of report.

§ Includes obligations which mature not more than 2 years after date of issue.

* Deficit or other reverse items.

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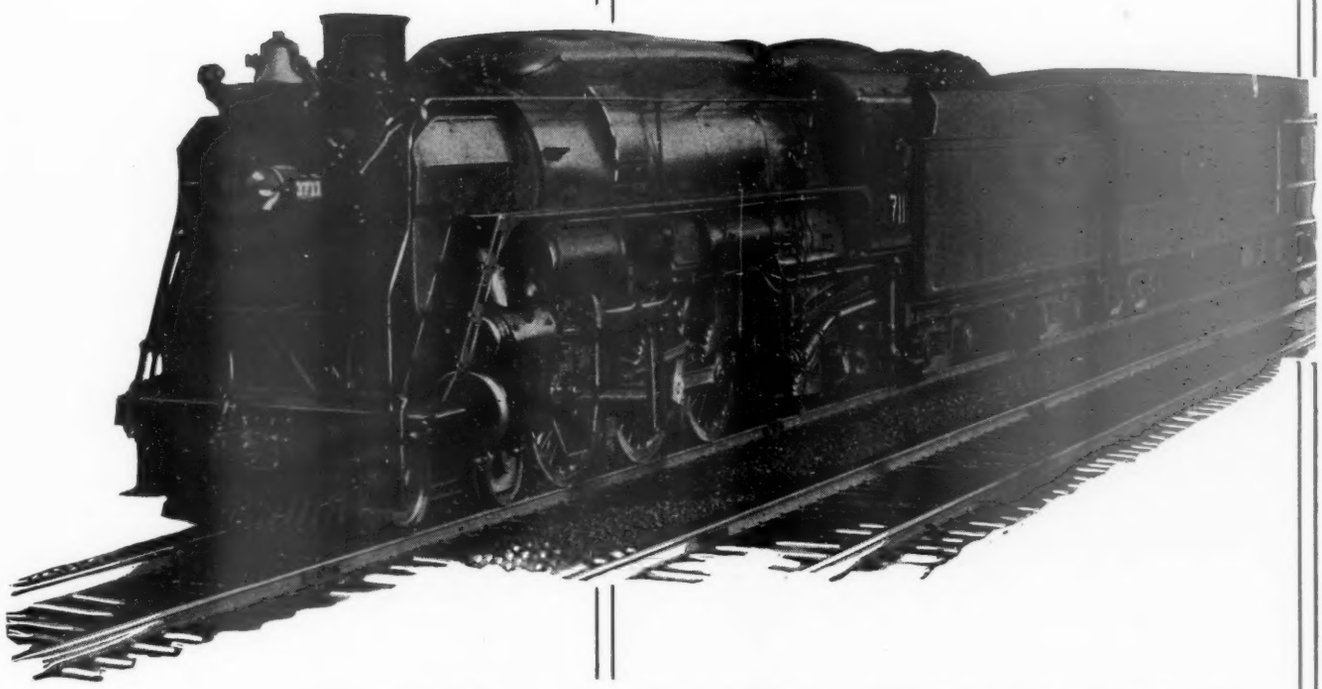
AN ADEQUATE REASON . . .



FOR NEW POWER

There may be many reasons why new power should be bought, but a single reason is sufficient—it will increase net returns.

It does this because it moves more tons at faster speeds; it requires less fuel per 1,000 ton-miles; it costs less to maintain and it is available for service more hours per day.

Whether light, passenger locomotives or the heaviest locomotives on the road, modern power will amortize its own cost and show an increase in net earnings.

LIMA LOCOMOTIVE WORKS INCORPORATED

LIMA LOCOMOTIVE WORKS, INCORPORATED, LIMA, OHIO

NET INCOME OF LARGE STEAM RAILWAYS WITH ANNUAL OPERATING REVENUES ABOVE $25,000,000

Name of railway	Net income after depreciation		Net income before depreciation	
	For the 6 months of 1936	1935	1936	1935
Alton R. R.	* $904,867	*$1,389,423	* $734,560	*$1,231,838
Atchison, Topeka & Santa Fe Ry. System§	* 526,422	1,424,398	5,147,949	7,216,935
Atlantic Coast Line R. R.	300,678	* 450,409	1,367,355	675,697
Baltimore & Ohio R. R.	* 1,981,278	* 2,496,158	1,713,200	972,836
Boston & Maine R. R.	* 2,757,437	* 283,145	* 1,936,061	534,754
Central of Georgia Ry.†	* 1,350,408	* 1,479,985	* 965,312	* 1,074,239
Central R. R. of New Jersey	* 1,701,530	* 516,746	* 934,793	307,388
Chesapeake & Ohio Ry.	17,903,747	13,487,586	22,115,553	17,565,514
Chicago & Eastern Illinois Ry.‡	* 654,193	* 854,658	* 357,386	* 549,320
Chicago & North Western Ry.‡	* 9,092,676	* 6,814,307	* 6,594,195	* 4,289,419
Chicago, Burlington & Quincy R. R.	* 942,194	* 3,542,392	1,352,895	* 1,020,792
Chicago Great Western R. R.‡	* 651,059	* 962,333	* 403,039	* 701,292
Chicago, Milwaukee, St. Paul & Pacific R. R.‡	* 9,226,946	*10,309,417	* 6,538,228	* 7,500,240
Chicago, Rock Island & Pacific Ry.‡	* 8,908,308	* 8,697,785	* 6,756,404	* 6,482,969
Chicago, St. Paul, Minneapolis & Omaha Ry.	* 1,458,671	* 1,575,359	* 1,159,793	* 1,260,215
Delaware & Hudson R. R.	* 890,793	* 1,050,626	* 337,115	* 559,031
Delaware, Lackawanna & Western R. R.	* 503,863	* 883,620	832,472	467,464
Denver & Rio Grande Western R. R.‡	* 2,891,424	* 2,583,611	* 2,313,196	* 1,987,278
Elgin, Joliet & Eastern Ry.	* 770,480	900,105	1,220,680	1,344,171
Erie R. R. (including Chicago & Erie R. R.)	158,653	* 668,000	2,104,942	1,349,719
Grand Trunk Western R. R.	975,269	* 197,715	1,551,181	339,601
Great Northern Ry.	* 2,869,036	* 3,298,244	* 1,026,435	* 1,483,968
Illinois Central R. R.	* 2,022,598	* 2,155,474	1,265,627	1,209,983
Lehigh Valley R. R.	29,682	* 417,234	1,180,057	754,283
Long Island R. R.	* 517,031	* 880,803	65,152	* 284,335
Louisville & Nashville R. R.	3,304,018	1,465,021	5,395,355	3,611,094
Minneapolis, St. Paul & Sault Ste. Marie Ry.	* 3,211,454	* 3,480,068	* 2,599,269	* 2,932,613
Missouri-Kansas-Texas Lines	* 1,468,840	* 2,704,736	* 826,369	* 2,052,981
Missouri Pacific R. R.‡	* 6,774,512	* 8,775,857	* 4,673,322	* 6,615,882
New York Central R. R.¶	360,864	* 4,160,013	8,452,096	4,160,153
New York, Chicago & St. Louis R. R.	1,139,037	7,465	1,912,149	823,220
New York, New Haven & Hartford R. R.‡	* 4,286,497	* 1,613,930	* 2,565,492	192,376
Norfolk & Western Ry.	14,482,962	9,934,057	16,731,828	12,186,049
Northern Pacific Ry.	* 5,177,419	* 6,504,463	* 3,612,915	* 4,909,951
Pennsylvania R. R.	11,763,894	10,126,169	22,594,570	20,870,541
Pere Marquette Ry.	1,166,983	337,177	2,433,060	1,624,214
Pittsburgh & Lake Erie R. R.	1,832,052	1,340,521	2,734,508	2,249,201
Reading Co.	2,944,465	2,587,038	4,540,036	4,076,725
St. Louis-San Francisco Ry.‡	* 4,535,093	* 6,416,747	* 2,919,903	* 4,834,407
St. Louis Southwestern Lines‡	* 139,278	* 299,298	164,059	13,590
Seaboard Air Line Ry.†	* 3,372,957	* 3,197,630	* 2,433,795	* 2,263,525
Southern Ry.	46,103	* 2,545,610	1,669,985	* 1,138,163
Southern Pacific Transportation System‖	113,912	* 3,323,895	4,057,820	450,318
Texas & Pacific Ry.	525,752	106,606	1,109 282	709,298
Union Pacific R. R.	2,976,519	3,578,382	6,158,659	6,820,349
Wabash Ry.†	* 1,449,021	* 1,588,022	* 381,215	* 504,624
Yazoo & Mississippi Valley R. R.	* 320,752	* 972,259	* 64,736	* 718,849

† Report of receiver or receivers.
‡ Report of trustee or trustees.
§ Includes Atchison, Topeka & Santa Fe Ry., Gulf, Colorado & Santa Fe Ry., and Panhandle & Santa Fe Ry.
¶ Includes Boston & Albany, lessor to New York Central R. R.
‖ Includes Southern Pacific Company and Texas & New Orleans R. R. The operation of all separately operated solely controlled affiliated companies, resulted in a net deficit of $1,898,058 for six months of 1936 and $1,957,392 for six months of 1935. These figures are not reflected in this statement.
* Deficit.

of $61,548,889 for the corresponding period of last year, according to the Interstate Commerce Commission's monthly compilation of selected income and balance-sheet items. For the month of June there was a net income, after charges, of $8,902,459, as compared with a deficit of $5,354,012 in June, 1935. For June alone 64 roads reported a net income while 71 reported net deficits. For six months 57 roads reported a net income while 78 reported deficits but in the corresponding period of last year only 48 roads had reported a net income while 87 had deficits.

Eastern Presidents' Conference

The Eastern Presidents' Conference resumed monthly meetings in New York on September 17 when a discussion was held on procedure to be followed by railroads in an effort to retain revenues derived from the Ex Parte 115 emergency freight charges which expire at the end of this year.

The conference also renominated its present representatives on the board of directors of the A. A. R. These are: Daniel Willard, president of the Baltimore & Ohio; M. W. Clement, president of the Pennsylvania; F. E. Williamson, president of the New York Central; C. E. Denney, president of the Erie; and E. S. French, president of the Boston & Maine. Also, it appointed to the Eastern Regional committee of the A. A. R., which is carrying on the former work of the Eastern Regional Co-ordinating Committee, Messrs. Williamson, Denney and Clement, together with Howard S. Palmer, president of the New York, New Haven & Hartford, and Edward W. Scheer, president of the Reading.

New Equipment

Class I railroads on September 1 had 22,354 new freight cars on order, the Association of American Railroads has announced. This compares with 7,240 cars on order on September 1, last year, and 8,372 cars on order on September 1, 1934. New locomotives on order on September 1 totaled 70, of which 53 were steam locomotives and 17 were electric and Diesel locomotives. On September 1, last year, there were 9 steam locomotives and 3 electrics on order, and on the same date, 1934, there were 35 steam and 106 electric locomotives on order.

New freight cars placed in service in the first eight months of this year totaled 20,588, compared with 2,819 new cars installed in the corresponding period of 1935, and 14,970 cars placed in service in the same period of 1934. There were 62 new locomotives placed in service in the eight months period this year, of which 42 were steam locomotives and 20 were electric and Diesel engines. In the corresponding period of 1935, 27 steam and 101 electric locomotives were placed in service, and during this period in 1934, 6 steam and 10 electric locomotives were installed in service.

Reading "Rail Ramble"

The Reading will inaugurate on October 4 a new type of excursion—the "rail ramble"—which will be operated through historic and picturesque places along the railroad, thereby providing "a full day of enjoyable educational travel." The excursion, which will be operated out of Philadelphia, Pa., is sponsored by the National Railway Historical Society.

The train will leave Reading terminal, Philadelphia, at 8:30 a.m. and will be operated through the Schuylkill Valley to Reading, where arrangements have been made for an escorted inspection trip through the Reading locomotive and car shops. Leaving Reading the train will proceed westward, skirting South Mountain and entering the Cocalico Valley, thence through Lancaster county to Lebanon. En route to the latter point a stop will be made at Cornwall Mine, where guides will be on hand to take passengers through the old charcoal furnace which has been producing copper-bearing iron ore since the Revolutionary days.

From Lebanon the train will enter the Blue Ridge Mountain section, passing Lickdale station, to the west of which is Indiantown Gap, the military reservation which is used annually for the Pennsylvania National Guard encampment. Next will come the run to Tremont, where the route turns eastward again, re-entering at Schuylkill Haven the Schuylkill Valley for the return trip back to Philadelphia, where it will arrive at 7:30 p.m.

The special excursion rate offered for the trip is $3, while a dining car serving inexpensive platter meals will be attached to the train throughout the entire run.

L.C.L. Refrigerator Container Being Developed

An l.c.l. refrigerator container, which can be picked up and delivered by truck and be transported by railroad in a standard 40-ft. box car, is being tested by the Universal Carloading & Distributing Company, Chicago. The outstanding feature of the container is its lightness, its total weight being 550 lb., and its load capacity, 210 cu. ft. The container, which is being constructed by the Sterling Lumber Company, Chicago, is made of wood, and has bunkers for 150 lb. of dry ice, enough to carry shipments through four days' transit without re-icing. The containers are insulated with Silvercote, a product of Silvercote Products, Inc. The containers also have electrical connections for the pre-heating of interiors for perishable movement during winter weather. The containers have a side dimension of seven by seven feet and front and back dimension of five by seven feet. Six can be loaded in a standard 40-ft. box car.

Because of the ease with which the containers can be handled on dollies at consignee's or consignor's places of business,

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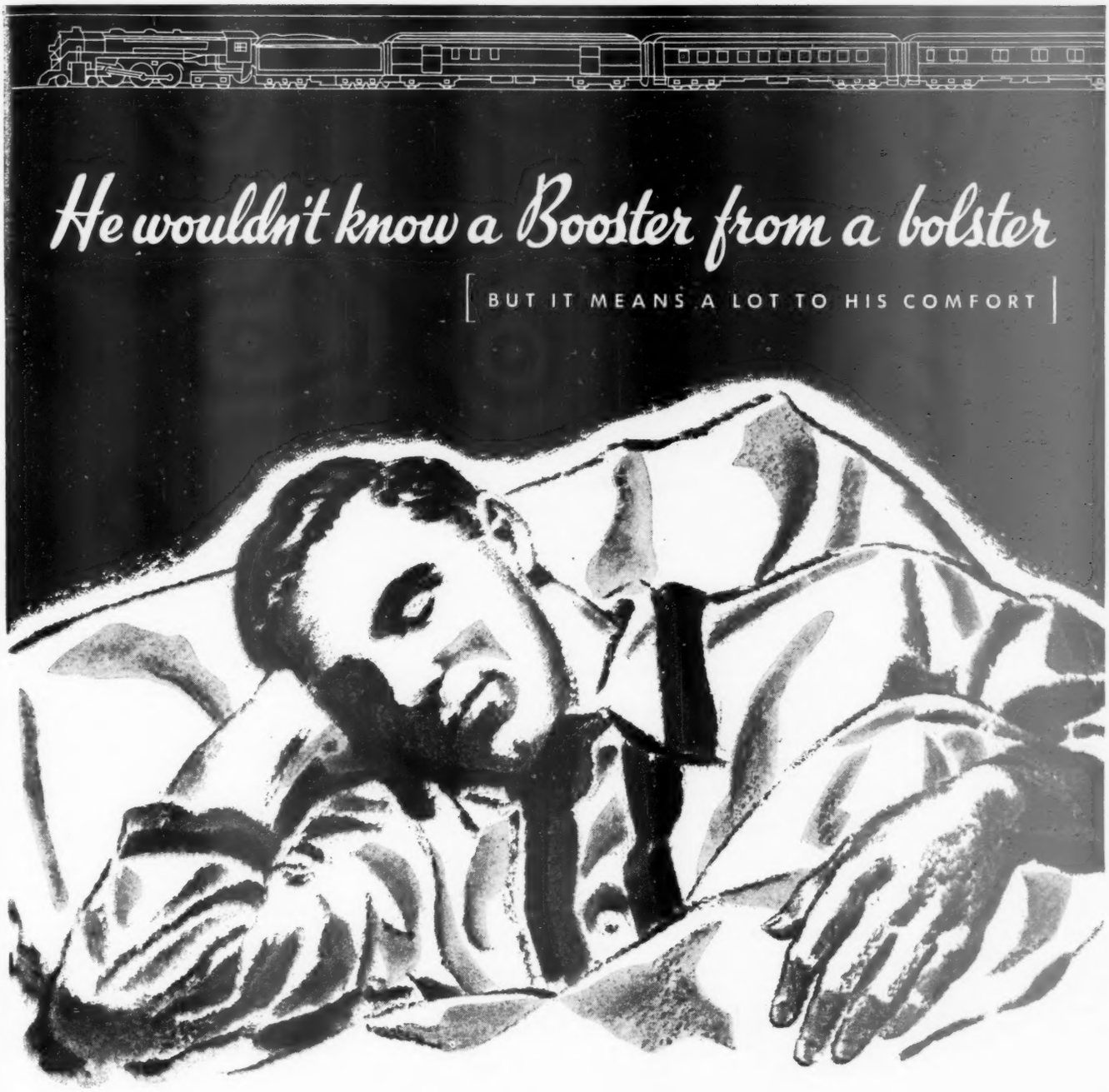
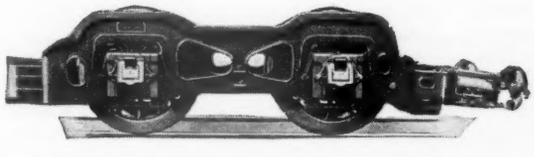


He doesn't know a Booster from a bolster, a Mikado from a Pacific. He has no interest in railroading except to be carried rapidly and comfortably. He wants to sleep--he doesn't like to be awakened every time the train starts. If he has been shaken up and jolted around in his berth, he growls to his fellow passengers in the morning. If he has had a good night's sleep, he "Feels fine"--and says so.

Booster trains make boosters of passengers.



FRANKLIN RAILWAY SUPPLY CO., INC.

NEW YORK
CHICAGO
MONTREAL

and readily loaded into box cars, the Universal Carloading & Distributing Company plans to purchase 100 for handling l.c.l. traffic forwarded by it.

Railway Accident Statistics

The Interstate Commerce Commission's completed statistics of steam railway accidents for the month of June, 1936, now in preparation for the printer, will show:

Item	Month of June 1936	Month of June 1935	6 months ended with June 1936	6 months ended with June 1935
Number of train accidents	556	500	4,216	3,232
Number of casualties in train, train-service and non-train accidents:				
Trespassers:				
Killed	291	288	1,218	1,204
Injured	278	317	1,274	1,432
Passengers on trains:				
(a) In train accidents*				
Killed	...	...	5	...
Injured	188	12	405	252
(b) In train-service accidents				
Killed	1	1	2	9
Injured	152	123	816	703
Travelers not on trains:				
Killed	1	1	8	5
Injured	53	34	390	311
Employees on duty:				
Killed	38	46	305	279
Injured	1,642	1,267	10,364	7,754
All other nontrespassers:**				
Killed	125	114	827	773
Injured	436	402	3,190	2,919
Total—All classes of persons:				
Killed	456	450	2,365	2,270
Injured	2,749	2,155	16,439	13,371

* Train accidents are distinguished from train-service accidents by the fact that the former cause damage of more than $150 to railway property.

** Casualties to "Other nontrespassers" happen chiefly at highway grade crossings. Total highway grade-crossing casualties *for all classes of persons, including both trespassers and nontrespassers,* were as follows:

Number of accidents..	255	246	1,929	1,829
Persons:				
Killed	116	100	758	730
Injured	268	281	2,270	2,165

One Hundred Years of Railroading in Harrisburg, Pa.

The one hundredth anniversary of the arrival of the first railroad train in Harrisburg, Pa., was celebrated on September 16 when 2,000 employees of the Pennsylvania attended a rally staged to demonstrate the part which the railroad has played in the social and economic life of the city. Harrisburg's first train entered the city on September 16, 1836, over the Harrisburg, Portsmouth, Mt. Joy & Lancaster, which is now a part of the Pennsylvania's main line.

The September 16 rally was but one event of the celebration which will continue until October 5, when the annual meeting of the Harrisburg Chamber of Commerce will be featured by the address of President M. W. Clement of the Pennsylvania. On that day also the railroad will place on exhibition in Harrisburg station a modern passenger train and a freight train with the latest types of open-top box and container cars. The passenger train will be headed by the Pennsylvania's new streamlined steam locomotive and its consist will include passenger coaches of the latest design, as well as new types of Pullman sleeping, lounge and observation cars; also a new type baggage car for the transportation of horses.

Local interest in the event is being demonstrated by the merchants of Harrisburg who are including, in their store window displays, scale models of Pennsylvania trains of today and of trains of 60 to 70 years ago. At the employees' rally a specially prepared program was distributed to each person attending. This contains ten pictures of the evolution of transportation and a short historical sketch of the history of the Harrisburg, Portsmouth, Mt. Joy & Lancaster. Speakers at the rally included A. Boyd Hamilton, former president of the Dauphin County Historical Society; Harry E. Core, general chairman of the Brotherhood of Locomotive Firemen and Enginemen; R. C. Morse, vice-president of the Pennsylvania, Eastern Region; Raymond Swenk, general superintendent of the Eastern Region; and F. W. Stoops, superintendent of the Philadelphia division. H. F. Sites of Harrisburg, a P.R.R. brakeman, presided.

Increased Panama Canal Toll Rates Urged

An upward revision of Panama Canal toll rates in fairness to taxpayers, industry and the public generally is urged by George R. Meyercord, a former president of the Illinois Manufacturers' Association and a member of its advisory committee. His views as chairman of a special committee of the association will be presented to a special commission appointed by the President to investigate canal toll rates which are acknowledged by the canal commission to be inadequate. Directors of the association have approved the report. The toll charges recommended in the report are determined after giving consideration to interest charges on an investment of $543,744,707, depreciation and obsolescence and operating loss.

"It is clear," says the report, "that the canal tolls are not sufficient to pay a return on the actual investment, or to pay the original and cumulative cost of the waterway. A doubling of the canal toll rates would still give them an advantage as against the American railroad's costs. In 1935 the net revenues from canal operations were less than $16,000,000. Contrast this small revenue with the capital investment of $543,744,707. We submit that it is unfair to land transportation of the United States to allow this condition to continue, when it is perfectly evident that these unduly low rates largely nullify the tariff duties that congress intended to levy when it passed the import tariff laws.

"By treaty the vessels of all nationalities must be treated impartially at the canal. Any benefits accruing to United States vessels by liberalization of the United States rules are passed on to foreign vessels, which up to the present time have been able to benefit thereby to a greater extent. In 1934, there was exempted from tonnage and toll charges 3,223,918 tons of cargo-carrying space, of which 1,139,130 tons was on United States vessels and 2,084,788 tons on foreign vessels. By making minor alterations and by taking full advantage of the United States rules in new construction, the pay tonnage has been reduced to less than 70 per cent of the earning space, a reduction of 15 per cent in 16 years.

"This steady and continuous reduction in pay tonnage as shown in the following table indicates the portion of the earning space on which it has been possible to charge tolls:

Percentage of Earning Capacity on Which Tolls Were Paid

1917	81.08	1927	78.40
1918	82.74	1928	77.60
1919	84.78	1929	76.38
1920	82.95	1930	75.65
1921	81.86	1931	74.09
1922	80.59	1932	72.82
1923	80.44	1933	71.70
1924	80.14	1934	71.22
1925	79.31	1935	69.87
1926	78.51		

"The laden rate has dropped from 95.1 cents per Panama canal net ton five years ago to 85.4 cents in 1935. Some vessels have so reduced their tonnage as to secure as low a rate as 54 cents. While it is not possible for all vessels to obtain such consideration under the United States rules, substantial reductions can still be secured. Three of the new Japanese vessels recently constructed paid only 67.9, 68.1, and 69.1 cents, and a fourth, only 70.2 cents per Panama Canal net ton. Under the proposed rates all of these vessels would pay 90 cents per Panama Canal net ton."

New Trains and Improved Speeds

The Pennsylvania announces that, with its new time table, September 27, the "Spirit of St. Louis," leaving New York westbound at 4:50 p.m., will be quickened (in both directions) so as to run through in 20 hr. 55 min.; and 30 minutes will be clipped from the running time of the train leaving St. Louis, Mo., for New York at 3 p.m., also that leaving at 6 p.m.

The "Midwesterner" is a new train which, leaving New York at 11:35 p.m., will run through to Chicago in 18 hr. 20 min.; and another through service to Chicago will leave New York at 4:10 p.m. and run through in 17 hr. 10 min. Several other trains will have their schedules shortened a half hour. Night trains between New York and Cleveland, Ohio, are to have through coaches as well as sleeping cars. Train No. 39, westward, is to be called the "Clevelander," and is to leave New York, with coaches as well as sleeping cars, at 8:15 p.m. Eastbound, the "Clevelander" will leave Cleveland at 8:05 p.m., taking the place of the "Red Arrow"; and Akron, Ohio, will have a new through train, the "Akronite," both ways; leave New York 7:50 p.m., leave Akron 6:10 p.m.

The New York Central announces that, with its new time table, September 27, the "Twentieth Century Limited" westbound will start at 5:30 p.m. and eastbound at 3:30 p.m. The "Southwestern Limited," leaving New York at 8 p.m., will be run through to St. Louis in 21 hr. 58 min. The "Wolverine," eastbound, leaving Chicago at 1:30 p.m., will be run through to New York in 17 hr. 50 min., and several other New York-Chicago trains will be quickened. The "Mercury" will leave Cleveland for Detroit, Mich., at 8:15 a.m., 45 minutes later than at present, and will run through in 2 hr. 45 min. The "Michigan" is to be a new day train each way between Chicago and Detroit, and the "Fort Orange" is a new train leaving New York at 11:50 p.m. for Albany and other central New York cities. The Air Liner will

Continued on next left-hand page

Security Brick Arches

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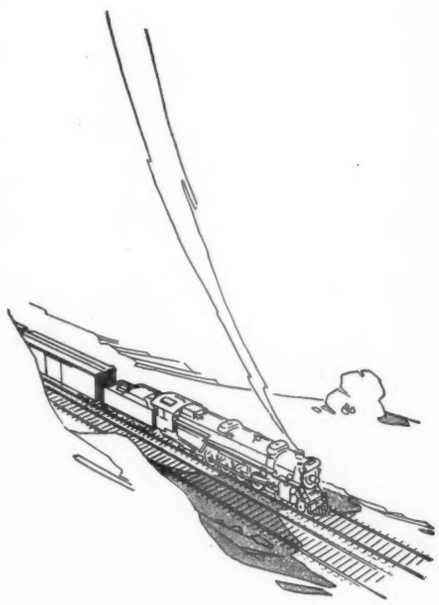
To show its full effectiveness as a fuel saver the firebox brick arch must be designed for the class of power in which it is to work.

Firebox designs are different and for full effectiveness the brick arch must be designed accordingly.

The Security Sectional Brick Arch is the result of many years of engineering and experience in locomotive operation, in studies of combustion and in the making of refractory brick.

Arch Company engineers over a period of many years have gained and applied a knowledge and experience nowhere else available. This knowledge and experience means many thousands of dollars each year in reduced fuel costs to the railroads of this country.



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HARBISON-WALKER REFRACTORIES CO.

Refractory Specialists

AMERICAN ARCH CO.
INCORPORATED

Locomotive Combustion Specialists » » »

be a new morning train from Toledo to Chicago.

The New York, New Haven & Hartford announces for September 27 a new train, Fridays only, to leave New York for Boston, Mass., at 5:25 p.m. and run through in five hours. The "Cabana," leaving New York on Saturday at 1:02 p.m., is to be discontinued. The train leaving Springfield, Mass., for New York at 10:15 a.m. and that leaving New York for Springfield at 6:10 p.m. will be quickened so as to run through in three hours.

Two trains over the Hell Gate Bridge route, Nos. 172 and 178, will be changed one hour when the clocks are changed The other trains on this route were not changed when daylight saving went into effect and so remain unchanged now.

Another "Off-the-Beaten-Track" Excursion

The Pennsylvania, pleased with the success of its recent excursions to places more or less out-of-the way, announces such an excursion from New York City on Sunday, September 27, passengers to be taken also from Newark, Elizabeth, New Brunswick and Trenton. The route, after leaving the main line at Trenton, N. J., is over the Trenton cutoff, a double track freight line, passing through King-of-Prussia and near Valley Forge. At Downington the train will be transferred to the New Holland branch and thence through the Welsh mountains. The train will pass the great power dams at Safe Harbor, Holtwood and Conowingo. Thence it goes to Perryville, Md., and from there over the main line back to New York.

The Track Supply Exhibit

Forty-five manufacturers of equipment and materials used in the construction and maintenance of track presented exhibits of their products under the auspices of the Track Supply Association at the Hotel Stevens, Chicago, on September 15-17, coincident with the convention of the Roadmasters' and Maintenance of Way Association of America.

The officers of the Track Supply Association who were responsible for the preparation and conduct of the exhibit this year were: President, Frank J. Reagan, American Fork & Hoe Company, Chicago; vice-presidents, H. H. Talboys, Nordberg Manufacturing Company, Milwaukee, Wis., and Jess Mossgrove, Austin-Western Road Machinery Company, Aurora, Ill.; secretary-treasurer, Dan J. Higgins, Gardner-Denver Company, Chicago; directors, George T. Willard, P & M Company, Chicago; Lewis Thomas, Q. & C. Company, Chicago; Lem Adams, Oxweld Railroad Service Company, Chicago; R. J. Platt, Sellers Manufacturing Company, Chicago; E. E. Thulin, Duff-Norton Manufacturing Company, Chicago; R. J. McComb, Woodings-Verona Tool Works, Chicago; and K. K. Cavins, Fairmont Railway Motors, Inc., Chicago.

In the election of officers Mr. Talboys was advanced to president; Mr. Mossgrove was elected first vice-president and Mr. Adams, second vice-president; Mr. Higgins was re-elected secretary-treasurer; and the following were elected to the board of directors: For one year to complete the unexpired term of Mr. Adams, Mr. McComb; for the two-year term, J. E. Mahoney, P & M Company, Chicago; E. C. Argust, Morden Frog & Crossing Works, Chicago, and F. W. Anderson, Northwestern Motor Company, Eau Claire, Wis.

The list of exhibitors, together with the materials on exhibit and the names of their representatives, follows:

Air Reduction Sales Company, New York; welding and cutting equipment; oxygen and acetylene regulators; carbide lights, lamps and lanterns; carbide; welding rods, goggles, built-up and heat-treated rail joints; J. F. Callahan, C. A. Daley, J. T. Gillespie, R. C. Holcomb, J. W. Kenefic, B. N. Law, L. C. McDowell, R. T. Peabody, U. F. Portel, E. F. Turner and M. M. Weist.

American Fork & Hoe Company, Cleveland, Ohio; rail anchors, tapered rail-joint shims, shovels, weed cutters, forks, rakes, scuffle hoes and broom rakes; H. C. Branahl, G. L. Dunn, S. L. Henderson, C. E. Irwin, T. A. Lawson, J. J. Nolan, Frank J. Reagan and F. C. Stowell.

American Hoist & Derrick Company, St. Paul, Minn.; photographs of work equipment; J. L. Hickey, Ward B. Maurer and Harold O. Washburn.

Austin-Western Road Machinery Company, Aurora, Ill.; models and moving pictures, and literature on air dump cars and power shovels; H. F. Barrows, J. D. Benbow, H. B. Bushnell, Jess Mossgrove, Bruce Smith and A. O. Teckemeyer.

Barco Manufacturing Company, Chicago; gasoline tie tampers, stoves, sand dryers, and flexible ball joints; F. N. Bard, W. J. Belhke, C. O. Jenista, L. J. Lytle and C. L. Mellor.

Buda Company, Harvey, Ill.; light section motor car, inspection motor car, extra-gang motor car, mechanical tie tamper, electric tie tamper, switch stand, bonding drill, track liners, rail bender, journal jacks, track jacks, tool grinder and tie spacers; H. C. Beebe, R. M. Blackburn, H. S. Brown, R. B. Fisher and G. A. Secor.

Caterpillar Tractor Company, Peoria, Ill.; Diesel tractor; G. A. W. Bell, Jr., J. H. Fitzgerald, H. M. Hale, W. A. Harding, Eugene Larsen, C. A. Spears and A. C. Thompson.

Chipman Chemical Company, Inc., Bound Brook, N. J.; J. K. Aiman and I. J. Strain.

Creepcheck Company, Inc., Chicago; rail anchors; T. D. Crowley, R. R. Dinklage and N. A. Howell.

Crerar Adams & Company, Chicago; track drills, tie bander, wrenches and rust-proof paint; Virgil Cunningham, George J. Doyle, Adolph Hawkinson, Edward C. Poehler, Irving E. Poehler, J. M. Temple and Thomas F. Tough.

Cullen-Friestedt Company, Chicago; motion pictures; W. C. Bamber, L. B. Bertau, C. J. Bronez, E. V. Cullen, F. J. Cullen, F. P. Cullen, C. H. Goodell and J. F. Leonard.

de Sanno & Son, A. P., Philadelphia, Pa.; radial grinding wheels; L. E. Buckingham, J. C. Rinehart, E. J. Rohan and W. K. Whelan.

Duff-Norton Manufacturing Company, Pittsburgh, Pa.; track jacks, power jacks, journal jacks, automatic lowering jacks and tie spacers; Dave Evans, W. F. Floyd, J. J. Gilchrist, G. C. Hutchinson, Jr., G. L. Mayer, A. Roberts, C. N. Thulin and E. E. Thulin.

Electric Tamper & Equipment Company, Ludington, Mich.; universal tamper, ballasting and tamping blades and tips, and concrete vibrator; V. G. Cartier, H. W. Cutshall, C. Jackson, G. W. Walters and T. M. Webb.

Fairmont Railway Motors, Inc., Fairmont, Minn.; inspection car, section car and heavy-duty motor car; C. P. Benning, W. D. Brooks, Kenneth Cavins, C. J. Dammann, Arthur R. Fletcher, C. H. Johnson, W. F. Kasper, J. T. McMahon, V. Pagett, J. E. Simkins, H. A. Sly and Wm. Williamson.

Hayes Track Appliance Company, Richmond, Ind.; bumping posts, wheel stops and portable derail; S. W. Hayes, Herbert J. Mayer and Paul C. McClure.

Hubbard & Company, Pittsburgh, Pa.; track tools, alloy track chisels, spike mauls, sledges, picks, wrenches, claw bars and adzes; J. S. Wincrantz.

Illinois Malleable Iron Company, Railroad division, Chicago; rail anchors; Chas. G. Ericson, W. T. Kelly and H. A. Morean.

Ingersoll-Rand Company, New York, N. Y.; pneumatic tie tamper, track wrench, rail drill, spike driver, screw-spike, wrench and clamp bolt wrench; W. H. Armstrong, G. E. Bridge, G. W. Morrow and T. H. Weigand.

O. F. Jordan, East Chicago, Ind.; model of spreader ditcher; A. W. Banton, J. C. Forbes and H. M. McFarland.

Kalamazoo Railway Supply Company, Kalamazoo, Mich.; one-man inspection car, light section motor car, motor-car engine, motor-car wheels, track gage and level; L. W. Bates, Ralph E. Keller, Frank E. McAllister and P. J. Robischung.

Keystone Grinder & Manufacturing Company, Pittsburgh, Pa.; track grinder, cross grinder and hand grinder and attachments; L. J. Cooney, A. P. Grenier, C. D. Hicks, J. M. Moore and Wm Newman.

Lundie Engineering Corporation, New York; tie plates and rail lubricator; L. B. Armstrong and O. W. Youngquist.

Maintenance Equipment Company, Chicago; switch point protector, rail and flange lubricator, derail, and literature on rail layer and switch point protector; D. M. Clarke, E. Overmier, T. E. Rodman, R. J. Shanahan and P. A. Wells.

Mall Tool Company, Chicago; portable rail grinders and flexible-shaft cross-grinding; M. Elrick, A. W. Mall, F. A. McGonigle and J. G. Sheppard.

Morden Frog & Crossing Works, Chicago; heat treated forge compromise joints, adjustable rail braces and miscellaneous forged fittings for switches; E. C. Argust, W. Homer Hartz, G. F. Killmer, L. I. Martin and Sam Withrow.

Nordberg Manufacturing Company, Milwaukee, Wis.; rail grinders, track power drill, power wrench, utility grinders and accessories; C. P. Clemmens, W. W. Fitzpatrick, C. K. Jensch and H. H. Talboys.

Northwestern Motor Company, Eau Claire, Wis.; hump and extra-gang car, section car and inspection motor car; motor car wheels, rail and frog surface grinder; F. W. Anderson, Otis B. Duncan, G. H. Goodell, A. H. Nelson, W. J. Roehl and W. J. Roehl, Jr.

Oxweld Railroad Service Company, Chicago; oxy-acetylene welding and cutting apparatus, oxygen, acetylene, carbide; Lem Adams, M. Burnett, Jr., W. E. Donalds, S. P. Donegan, F. J. Duffy, J. R. Garrett, W. H. Kofmehl, D. H. Pittman, L. C. Ryan and J. C. Stephenson.

P & M Company, Chicago; rail anti-creepers and bond-wire protectors, tie plate assemblies; J. J. Gallagher, D. T. Hallberg, P. H. Hamilton, G. E. Johnson, J. E. Mahoney, W. A. Maxwell, F. S. Schwinn, Jr., G. E. Webster and G. T. Willard.

Pocket List of Railroad Officials, New York; copies of Pocket List of Railroad Officials; H. A. Brown and B. J. Wilson.

Positive Rail Anchor Company, Chicago; rail anchors and guard-rail plates and braces, adjustable rail braces; L. C. Ferguson and A. H. Told.

Q & C Company, New York; guard-rail clamp, switch-point guard, electric snow melter, compromise joints, derail, gaging tools, rail tongs and gage rods; G. H. Goodell, L. E. Hassman, J. L. Terry and Lewis Thomas.

Rail Joint Company, New York; insulated and standard rail joints; Alex Chapman, E. A. Condit, W. E. Gadd, Harry C. Hickey, G. H. Larson, R. W. Payne and Thomas Ryan.

Rails Company, New Haven, Conn.; M & L track, compression track construction, compression screw spike, full throated cut spike, oil, gas and electric switch heaters, track lubricator; L. T. Burwell.

Railway Age, Chicago; copies of Railway Engineering and Maintenance and *Railway Age*; G. E. Boyd, M. H. Dick, S. W. Hickey, N. D. Howard, Elmer T. Howson, F. C. Koch, W. S. Lacher, J. G. Little, H. E. McCandless and H. A. Morrison.

Railway Purchases & Stores, Chicago; copies of Railway Purchases and Stores; J. P. Murphy and K. F. Sheeran.

Railway Track-Work Company, Philadelphia, Pa.; portable electric track grinder, portable stock-rail grinder, rail-joint cross grinder, portable reciprocating grinder, portable flexible shaft grinder and grinding wheels; W. B. Goodall, H. M. Moorhead and A. M. Nardini.

Ramapo Ajax Corporation, New York; switch stands, rail lubricators, metal highway crossings; W. Bender, W. M. Brooks, G. A. Carlson, G. M. Cooper, R. E. Einstein, H. Hazelton, A. F. Hess, Hilton P. Hoffman, A. F. Huber, J. S. Hutchins, W. Janicki, S. A. McVicker and W. Perdue.

S. E. Rawls Company, Streator, Ill.; railway track and right-of-way mowing equipment; C. F. Butts, E. J. Jaeger, L. C. Meskimen, M. E. Rawls and S. E. Rawls.

Republic Steel Corporation, Cleveland, Ohio; curve guard rail, tie plates, lockers, filing cabinets, steel fence posts, wire, nails, staples, track spikes, corrugated culverts, highway crossings, track bolts and nuts, and steel tubing; C. H. Aiken, A. E. Brown, C. H. Ellison, L. W. Fletcher, A. D. McAdam, C. F. Newpher, W. T. O'Neill, A. J. Roof, C. W. Ruth and L. L. Solger.

Sellers Manufacturing Company, Chicago; wrought iron tie plates and angle bars; J. T. Flynn, G. M. Hogan, R. J. Platt and R. A. Van Houten.

Teleweld, Inc., Chicago; rail joint shims, samples of welded rails showing effects of pre-heating, samples of heat-treated rail and field hardness testing kit; C. R. Fohs and G. A. Green.

Templeton, Kenly & Company, Chicago; track and bridge jacks, tie spacer, and rail puller and expander; R. B. Hill, P. H. McManus, Chas. Neher, Wm. Simpson, J. B. Templeton and W. B. Templeton.

Woodings-Verona Tool Works and Woodings Forge & Tool Company, Verona, Pa.; rail anchors, gaging tool, track levels and gages, spring-clip and bent-shoulder tie plates and lock washers; James McComb, R. J. McComb, G. L. McKewin, J. M. Moore and W. H. Woodings.

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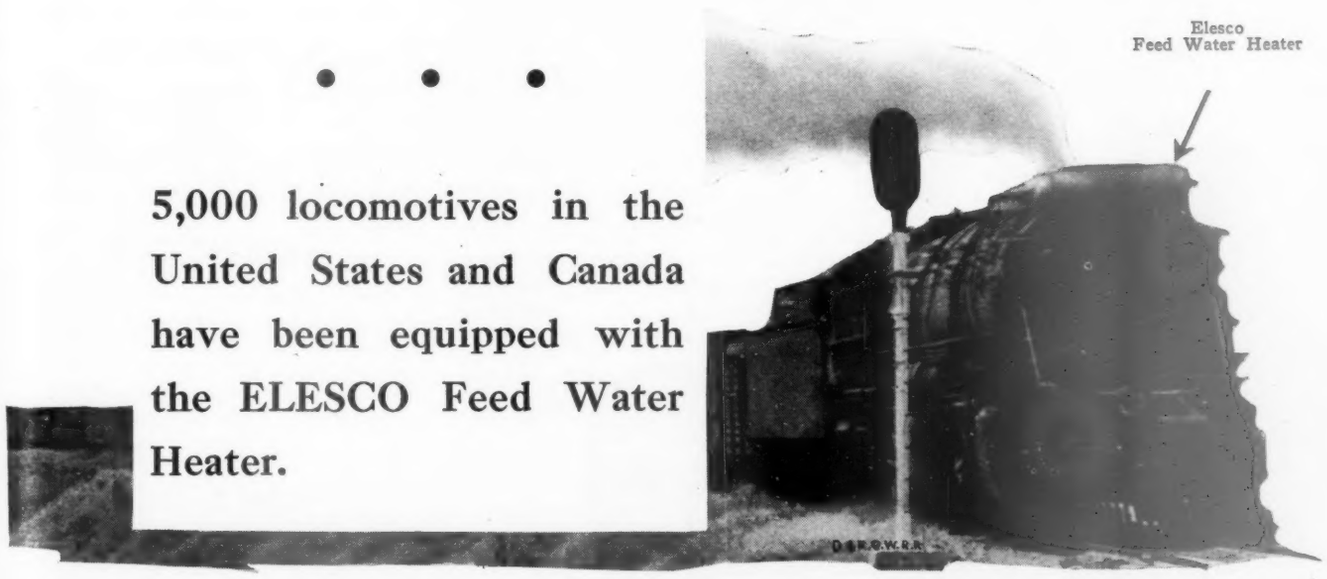
How to Increase Boiler Evaporation

Evaporation without a feed water heater . . . burning 121½ lb. of coal per sq. ft. grate per hr. . . . 42,500 lb. net per hr.

Evaporation with Elesco feed water heater . . . under the same conditions . . . 48,804 lb. net per hr.

• • •

5,000 locomotives in the United States and Canada have been equipped with the ELESCO Feed Water Heater.



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Supply Trade

Joseph Davis, executive vice-president of the **American Locomotive Company,** on account of ill health, tended his resignation which was accepted on September 24. **David Dasso** was appointed vice-president of the Diesel-Engine Division with headquarters in New York, succeeding **R. B. McColl** who has resigned to become president of Alco Products, Inc., a subsidiary of the American Locomotive Company. Mr. Davis also resigned as a director, member of the executive committee and president of Alco Products, Inc., division of the American Locomotive Company. Mr. McColl, in addition to being president, was appointed a director, and member of the executive committee of Alco Products, Inc., to succeed Mr. Davis.

Frederic E. Lyford, who has been appointed assistant to **Robert S. Binkerd,** vice-president of the **Baldwin Locomotive Works,** was born on January 20, 1895, and was graduated in mechanical engineering from Cornell University. After a year in the service of a ship-building concern and a machine tool company, he

Frederic E. Lyford

entered the army, serving in the field artillery and in the air service in France as first lieutenant. In 1919, he became an assistant sales manager of the Allied Machinery Company of America, resigning the following year to engage in advertising and sales promotion work for a milling company at Waverly, N. Y. In 1923, he entered the service of the Lehigh Valley as apprentice instructor in connection with which he also directed classes for the instruction of mechanical department foremen. Subsequently, he served three years as assistant general machine foreman at the Sayre locomotive shops of the Lehigh Valley, during which period he also handled engineering problems for the shop superintendent. Later, Mr. Lyford was promoted to the position of special engineer to the executive vice-president, in which capacity he made studies of a wide variety of mechanical department subjects, including water treatment, locomotive lubrication and the design and economy of new power. In February, 1934, he left the Lehigh Valley to become an examiner for the Railroad division of the Reconstruction Finance Corporation, which position he resigned to join the Baldwin organization.

Everett Chapman, vice-president of **Lukenweld, Inc.,** Coatesville, Pa., has been elected president to succeed **G. Donald Spackman,** who has been appointed

Everett Chapman

general superintendent of the **Lukens Steel Company. Robert J. Whiting,** superintendent of Lukenweld, Inc., in charge of all manufacturing, has been elected vice-president of Lukenweld.

Everett Chapman was born at Detroit, Mich., on May 9, 1901. He attended grade school and high school at Detroit and was later employed by the Detroit Testing Laboratories. In 1919 he entered the University of Michigan, where he obtained the degree of bachelor of science in electrical engineering in 1923. After a year's graduate work in physics, his senior thesis on electrical vibration of high frequencies having gained for him the degree of master of science, he became an instructor in electrical engineering at Purdue University. In 1925 he joined the Lincoln Electric Company, Cleveland, Ohio, as an experimental engineer. In 1930 he became director of development and research of Lukenweld, Inc., of which

Robert J. Whiting

company he was elected vice-president early in 1934.

Robert J. Whiting, vice-president of Lukenweld, was born in 1885 at Foster, Pa. He attended grade school, high school and business college at Scranton, and in 1906 obtained employment with the Keller Manufacturing Company, Scranton, vehicle manufacturers. In 1909 he entered the service of the Pickering Engineering Company, Hartford, Conn., where he was engaged principally in problems of structural design concerned with power-plant equipment. In 1913 he became master mechanic on plant equipment for the Ford Motor Company, Detroit, Mich., later being appointed superintendent of body construction at the Ford plant. During the war he was in charge of the men employed at the Ford Motor Company for the construction of boats for the United States Navy. In 1923 he became production engineer for the Fisher Body Corporation, and for four and one-half years was manager of Fisher's Flint, Mich., unit No. 1. In May, 1934, Mr. Whiting resigned to become superintendent of Lukenweld, Inc.

OBITUARY

William H. Shuey, who retired in 1908 as manager of the Railway Age, a predecessor of the present *Railway Age,* died on September 22 in a sanitarium near Aurora, Ill., at the age of 92 years.

Equipment and Supplies

LOCOMOTIVES

THE BIRMINGHAM SOUTHERN has ordered five 900-hp. Diesel-electric locomotives from the American Locomotive Company. Inquiry for this equipment was reported in the *Railway Age* of August 22.

FREIGHT CARS

THE CINCINNATI, NEW ORLEANS & TEXAS PACIFIC is asking for bids on or before September 28 for 10 steel side dump cars of 30 cu. yd. capacity, of the drop door type to be air operated and of heavy construction suitable for handling earth or rock.

IRON & STEEL

THE WABASH has ordered 5,000 tons of rail from the Carnegie-Illinois Steel Corporation, the Inland Steel Company and the Bethlehem Steel Company.

NEW YORK CENTRAL.—A contract has been given to the American Bridge Company for 6,000 tons of steel to be used on the West Side Improvements of this road between 98th street and 111th street, New York City. The Del Balso Construction Corporation, New York, is the contractor.

SIGNALING

Arkansas Signal Contracts

The Arkansas State Highway Commission, Little Rock, announces that highway

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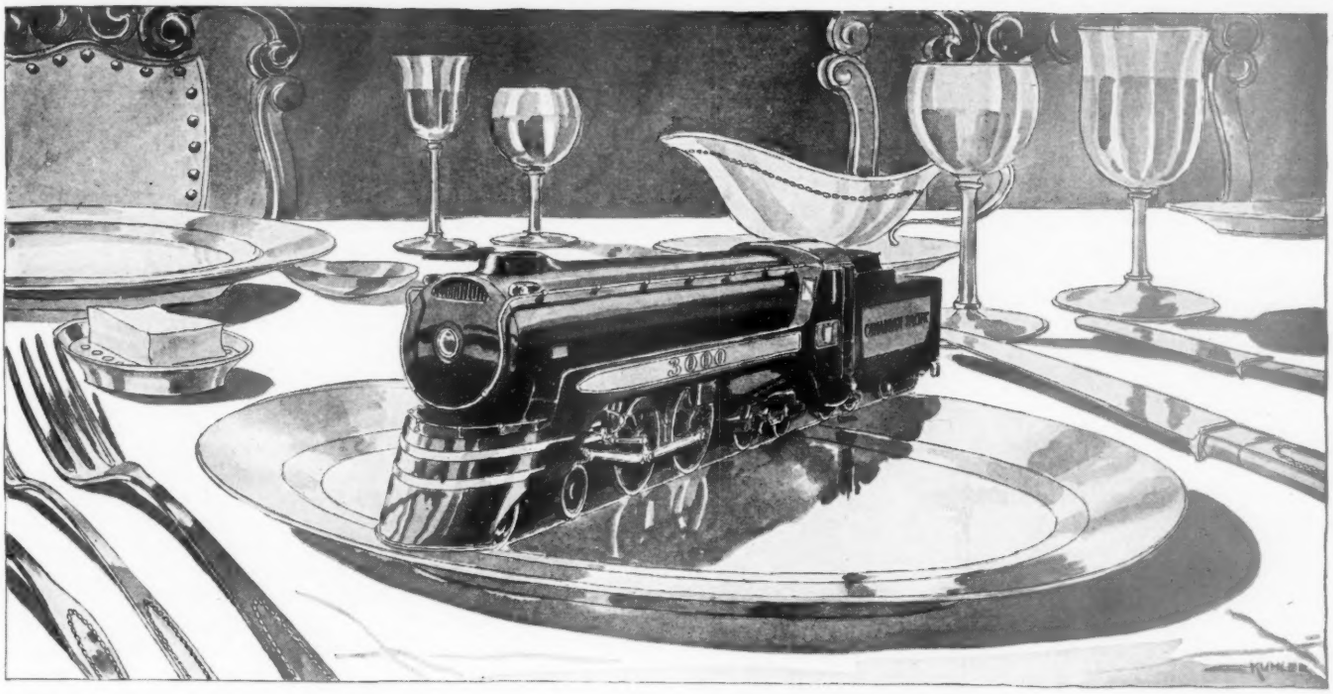

FOOD FOR THOUGHT

THE Canadian Pacific Railway is the largest travel organization in the world. They have been watching, studying, and thoroughly analyzing all the developments of late in ultra high speed service. • • • It, therefore, is significant that when the officers of this organization decided to install this service on their own line they unhesitatingly specified a steam power unit.

AMERICAN LOCOMOTIVE COMPANY

ALCO

50 CHURCH STREET · NEW YORK · N.Y.

crossing signal projects are contemplated on six different railroads, and bids for the work are to be received by the Commission until September 29 at 10 a.m.

Manufacturers are invited to bid for furnishing materials for flashing light signals at 10 crossings on the Chicago, Rock Island & Pacific; eight crossings on the Missouri Pacific; three on the St. Louis Southwestern and one on the Texas & Pacific. For work on the Fort Smith & Western contractors are invited to bid for the furnishing and installing of signals at Wheeler avenue, Fort Smith. For the Missouri & Arkansas similar bids are invited for crossings at four towns—Harrison, Urbanette, Leslie and Dixie.

State regulations contain special provisions concerning subletting or assigning contracts; concerning the use of domestic materials and on minimum rates of wages of men employed.

MISCELLANEOUS

THE DENVER & RIO GRANDE WESTERN has secured permission from the United States district court at Denver, Colo., to spend an additional $600,000 for improvements.

Construction

ATCHISON, TOPEKA & SANTA FE.—Two contracts have been awarded to Cameron, Joyce & Company, Keokuk, Iowa, for grading in connection with curve reduction work—one for work in the vicinity of Gorin, Mo., involving an expenditure of about $100,000, and the other for work in the vicinity of Sibley, Mo., at an estimated cost of $40,000. The List Construction Company, Kansas City, Mo., has been awarded a contract for grading in connection with curve reduction work near Chillicothe, Ill., at an estimated cost of $46,000. These projects are a part of the curve reduction program that is being carried out on the Santa Fe incident to the inauguration of high-speed operation.

DELAWARE, LACKAWANNA & WESTERN-NEW YORK CENTRAL-LEHIGH VALLEY-ERIE.—The New York Public Service Commission has approved specifications and an estimate of cost of $661,975, exclusive of land and property damages, for the elimination of the Transit Road crossings of these railroads in the town of Depew, N. Y. The commission also authorized the Delaware, Lackawanna & Western to do certain work in connection with the elimination at actual cost without contract, limited to $33,500.

DELAWARE, LACKAWANNA & WESTERN.—A revised estimate of cost of $177,360, exclusive of land and property damages, for the elimination of the grade crossing of this road on the Pavilion-Canawaugus highway in the town of Pavilion, N. Y., has been approved by the New York Public Service Commission. The railroad company submitted the revised cost estimate.

The commission also approved detail plans and specifications and an estimate of cost of $32,500 covering proposed drainage subways at Madison avenue, Lake street and Washington avenue in Elmira, N. Y. These are to be constructed in connection with the elimination of the grade crossings of this road in Elmira.

LONG ISLAND.—This road has given a contract to Tully & Di Napoli, Long Island City, N. Y., for grade crossing elimination work at Smithtown, N. Y. The work calls for the use of 240 tons of steel.

LOUISVILLE & NASHVILLE.—A contract has been awarded to H. K. Williams, Louisville, Ky., for the construction of about 25,000 sq. yd. of concrete roadways at this company's shops and storeroom at South Louisville, Ky. With the exception of one test panel of cement-bound macadam the roadways will be of plain concrete. The total cost of this project, including incidental drainage and track work, will be about $88,000.

NEW YORK CENTRAL.—A contract has been given to the Del Balso Construction Corporation, New York, for the West Side Improvements of this road between 98th street and 111th street, New York City. See item in *Railway Age*, September 12, page 390.

NEW YORK CENTRAL.—The New York Public Service Commission has approved detail plans, specifications and an estimated cost of $53,500 for the construction of a maintenance of way building at Syracuse, N. Y., in connection with the elimination of the grade crossings of this road in Syracuse. The building is to be constructed in Peat Street yards.

NEW YORK & LONG BRANCH.—The reconstruction of Big Shark River bridge at Belmar-Avon, N. J., substituting a bascule bridge for the existing fixed span, has been authorized at a cost of between $280,000 and $300,000. Bids have been received for the construction of a temporary double track runaround trestle in connection with the above bridge to cost between $30,000 and $35,000.

PENNSYLVANIA.—Bids were received by this road at New York, on September 24, for the construction of a railroad bridge at Oak Tree road, Iselin, N. J., and separate bids for construction of a railroad bridge at Avenel street, Avenel, N. J.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS.—The Board of Public Service of St. Louis, Mo., will take bids until October 9 on work incident to the completion of the railroad deck and approaches to the St. Louis Municipal bridge across the Mississippi river between St. Louis and East St. Louis, Ill. The work consists of deck and track construction at an estimated cost of $187,000, the furnishing and delivering of timber at an estimated cost of $108,600, and the construction of a connection between the bridge and the Missouri Pacific, at a cost of about $52,000.

Financial

ATCHISON, TOPEKA & SANTA FE.—*Acquisition.*—The Southern Kansas Stage Lines has applied to the Interstate Commerce Commission for authority to acquire the franchise of the Davis Transfer & Storage Company, which has rights between Guthrie, Okla., and Oklahoma City, for $2,500.

ATCHISON, TOPEKA & SANTA FE.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to acquire control of the Fort Worth & Rio Grande by purchase of its stock from the trustees of the St. Louis-San Francisco and the Gulf, Colorado & Santa Fe has asked authority to operate the properties under lease except certain terminal properties at Fort Worth, Tex., which are to be acquired by the St. Louis, San Francisco & Texas.

CHICAGO & NORTHWESTERN.—*Abandonment.*—The Interstate Commerce Commission has authorized the trustee of this company to abandon portions of a branch line between Gillett Junction, Wis., and Northern Junction (0.4 mile), Northern Junction to Southern Junction (13.5 miles) and Shawano Junction to a point near Clintonville (12.8 miles).

NORFOLK SOUTHERN.—*Acquisition.*—The Norfolk Southern Bus Corporation has applied to the Interstate Commerce Commission for authority to acquire the business of the Virginia Dare Transportation Company, operating between Norfolk, Va., and Elizabeth City, N. C.

SAVANNAH & ATLANTA.—*Receiver's Equipment Trust.*—The Interstate Commerce Commission has authorized the receiver of this company to assume liability for $160,000 of 4 per cent equipment trust certificates, maturing 1937-41, to be sold at par and the proceeds used to buy 196 second-hand box cars.

UNION PACIFIC. — *Debentures.* — Kuhn, Loeb & Co. is offering, subject to the approval of the Interstate Commerce Commission, an issue of $20,000,000 of 3½ per cent debenture bonds of this company, due 1970, the proceeds to be used to pay a like amount of 40-year 4 per cent bonds due in 1968 which are to be called for redemption on December 1 at par and accrued interest. The issue is priced at 99½, and the railroad has arranged to sell the issue to the bankers at 97½.

Average Prices of Stocks and of Bonds

	Sept. 22	Last week	Last year
Average price of 20 representative railway stocks..	56.25	55.09	36.09
Average price of 20 representative railway bonds..	83.88	83.20	73.38

Dividends Declared

Norfolk & Western.—8 Per Cent Preferred, $2.00, quarterly, payable October 1 to holders of record September 15.

Norfolk & Western.—Preferred, $1.00, quarterly, payable November 19 to holders of record October 31.

Pullman, Inc.—37½c, quarterly, payable November 16 to holders of record October 24.

Virginian.—6 Per Cent Preferred, $1.50, quarterly, payable November 2 to holders of record October 15.

Continued on next left-hand page

NO DANGER - - -

- - - to highway users when "Union" Flashing Light Highway Crossing Signals act as silent but ever alert watchmen. » » »

1881 **Union Switch & Signal Co.** 1936

SWISSVALE, PA.

NEW YORK MONTREAL CHICAGO ST. LOUIS SAN FRANCISCO

Railway Officers

OPERATING

William V. McCarthy has been appointed trainmaster of the Mohawk division of the New York Central, effective October 1.

C. D. Arnold, assistant to general manager of the Seaboard Air Line, has been assigned duties heretofore assigned to the assistant general manager, with headquarters in Norfolk, Va. **D. Leard** has been appointed assistant to general manager at Norfolk, taking over Mr. Arnold's former duties.

R. C. Parsons, superintendent of transportation of the Louisville & Nashville, with headquarters at Louisville, Ky., has been appointed also director of personnel, succeeding **John Bose,** who has retired. **Don K. Price,** assistant superintendent of the Cumberland Valley division, with headquarters at Middlesboro, Ky., has been promoted to superintendent of the Cincinnati division, with headquarters at Latonia, Ky., to replace **J. G. Metcalfe,** who has been appointed to the newly-created position of assistant superintendent of transportation, with headquarters at Louisville. **N. H. Lockney,** trainmaster on the Cincinnati division at Latonia, has been advanced to assistant superintendent of the Cumberland Valley division, to replace Mr. Price, and has been succeeded as trainmaster at Latonia by **W. T. Cummins,** assistant trainmaster at that point. **T. A. McDonald,** chief dispatcher at Latonia, has been appointed assistant trainmaster, to succeed Mr. Cummins.

John P. Polk, assistant superintendent of the Nashville (Tenn.) terminals, has been promoted to assistant director of personnel, with headquarters at Louisville, to succeed **J. J. Grosche,** who, because of ill health, has been assigned to other duties. **R. D. Smith,** trainmaster at Corbin, Ky., has been promoted to assistant superintendent at Nashville, to replace Mr. Polk.

Edgar H. Major, chief clerk in the office of the superintendent of transportation at Louisville, has been appointed to the newly-created position of superintendent of car service, in which capacity he succeeds to the duties of **R. F. Watts,** car accountant, deceased.

Herman A. Benton, whose appointment as general manager for the Seaboard Air Line at Norfolk, Va., was noted in the *Railway Age* of September 19, was born on November 11, 1883, at Monroe, N. C. He entered railroad service on January 1, 1901, with the Seaboard Air Line and served until July, 1903, as baggage, seal and transfer clerk, flagman and yard conductor at Monroe. He then served for a year as conductor for the Mexican and in August, 1904, became conductor for the Vera Cruz & Pacific (now National of Mexico). In September, 1905, Mr. Benton became yardmaster for the Mexican Central (now National of Mexico). He returned to the Seaboard Air Line in July, 1906, and served as yard clerk, night yardmaster and general yardmaster until June 15, 1914, when he became trainmaster of the Virginia and

H. A. Benton

Georgia divisions. On September 14, 1925, he was appointed superintendent, serving in this capacity successively at Atlanta, Ga., Tampa, Fla., and Savannah, Ga. Mr. Benton was appointed assistant general manager at Norfolk on September 10, 1934, which position he held until his recent appointment as general manager.

TRAFFIC

Howard E. Simpson, general eastern passenger agent of the Baltimore & Ohio, with headquarters at New York, has been appointed assistant to general passenger traffic manager, with headquarters at Baltimore, Md., effective October 1. Mr. Simpson was born in Jersey City, N. J., on March 15, 1896, and entered the service of the Central of New Jersey in 1912 as clerk, serving in that capacity and in various minor positions until November, 1917. From the latter date until May, 1919, he served in the United States Navy, then returning to the Jersey Central as purser on the steamer "Sandy Hook," operated by that road. He became rate clerk in 1920 and two years later was appointed city passenger agent at New York. From 1925 to 1926, Mr. Simpson was advertising agent and from January to May of the latter year he served as district passenger agent at Newark, N. J. From May to July, 1926, he was general eastern passenger agent at New York, and on the latter date was appointed assistant general passenger agent at the same point. He was appointed general eastern passenger agent for the B. & O. in July, 1931.

Howard E. Simpson

Arthur C. Leake has been appointed to the newly-created position of general agent for the Minneapolis & St. Louis at Birmingham, Ala.

A. M. Reinhardt, assistant general freight agent on the Atchison, Topeka & Santa Fe at San Francisco, Cal., has been promoted to general freight agent, with the same headquarters, to succeed **Paul P. Hastings,** whose appointment as assistant freight traffic manager was announced in the *Railway Age* of August 1. **G. T. Hurst,** chief clerk in the general freight office at San Francisco, has been appointed assistant general freight agent at San Francisco. **Walter S. Pitchford,** chief clerk to the division freight agent at San Francisco, has been promoted to general agent at Sacramento, Cal., and **R. S. Hirsch,** general agent at the latter point, has been appointed division freight agent at Los Angeles.

E. N. Thorn, assistant general passenger agent of the Baltimore & Ohio, has been appointed general passenger agent, with headquarters as before at Baltimore, Md. **J. F. Whittington,** general passenger agent, with headquarters at Cincinnati, Ohio, has been transferred in the same capacity to New York. **E. J. Gleason,** assistant general passenger agent, with headquarters at Chicago, Ill., has been appointed general passenger agent, with headquarters at Cincinnati. **W. C. Stotler,** division passenger agent at Philadelphia, Pa., has been appointed assistant general passenger agent, with headquarters at Chicago. **R. E. Coleman,** division passenger agent at Washington, D. C., has been transferred in the same capacity to Philadelphia.

OBITUARY

Dr. Schuyler Weston Hammond, chief surgeon of the Rutland, died of a heart ailment at his home in Rutland, Vt., on September 23. He was 69 years of age.

William N. Jones, who retired in 1934 as assistant general freight agent on the Chicago & North Western, with headquarters at Chicago, died at his home in Evanston (a suburb of Chicago), on September 19. Mr. Jones was 72 years of age.

J. G. Stuart, who retired on January 1, 1936, as assistant purchasing agent of the Chicago, Burlington & Quincy, with headquarters at Chicago, died on September 21 at his home at Aurora, Ill., following a long illness. He was 65 years of age and entered the service of the Burlington in 1887. A photograph of Mr. Stuart and a biographical sketch of his railway career was published in the *Railway Age* of January 11, in connection with the announcement of his retirement

Grips Foot or Tire 4-Ways

. . . Inland 4-Way Floor Plate

4-Way Safety

Extra Stiffness

4-Way Matching

4-Way Drainage

The most widely used floor plate is Inland 4-Way. It has earned this leadership since 1931 by offering 4 advantages in exclusive combination.

The Inland 4-Way Pattern (Patented) provides 4-Way Safety; the projections center one another at right angles, presenting equal traction all 4-ways instead of the usual 2. It matches 4-ways giving a continuous, neat, and safe pattern clear across the area covered. Since projections overlap equally 4-ways, it is equally stiff along all dimensions. And it drains and sweeps readily 4-ways.

Made in 3 patterns, differing only in the size of projections and ranges of thickness (minimum 16 gage for Light, up to ¾-inch for the Large Pattern) Inland 4-Way Floor Plate covers all requirements for steel safety treads. Leading warehouses stock it.

Write for the latest folder. Includes stimulating illustrations, describes all advantages. INLAND STEEL COMPANY, 38 So. Dearborn St., Chicago, Illinois.

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Sheets Strip Tin Plate
Plates Structurals Piling

Rails Track Accessories
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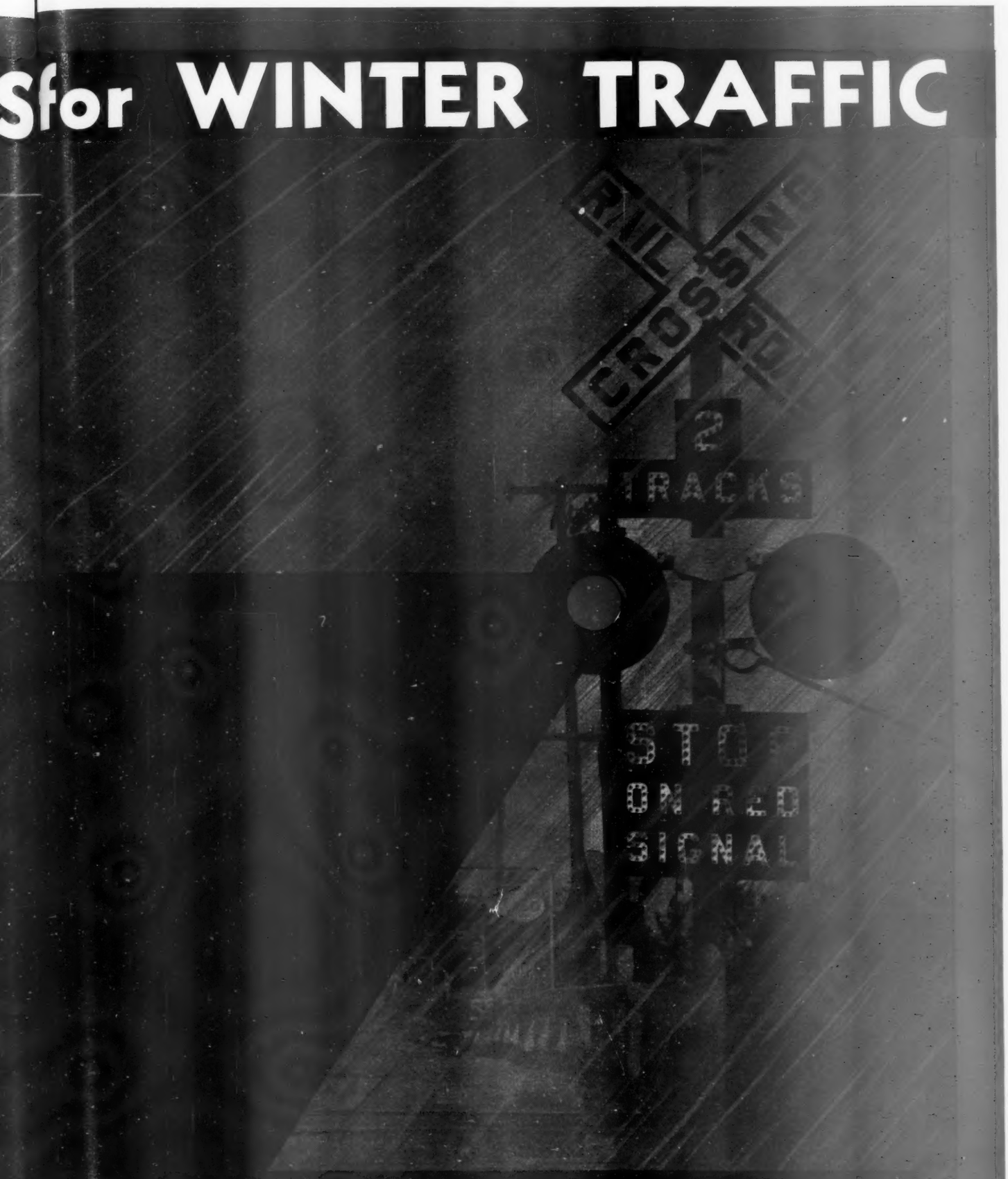
PROTECT CROSSINGS

The hazard at unprotected grade crossings is intensified during the winter season. Blinding snow, sleet on windshields, and slippery roads add to the necessity of adequate protection.

G-R-S AUTOMATIC CROSSING SIGNALS with their intense, flashing red lights and conspicuous reflector button signs give a distinctive penetrating warning of danger which can easily be observed some distance from the crossing.

Why delay installation when one damage claim may offset the complete cost of installing 24-hour-a-day protection with G-R-S Type XA or XB Crossing Signals? See Bulletin 165 or Catalog Section H, Part 29 for details and ordering information.

Sfor WINTER TRAFFIC



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GENERAL RAILWAY SIGNAL COMPANY

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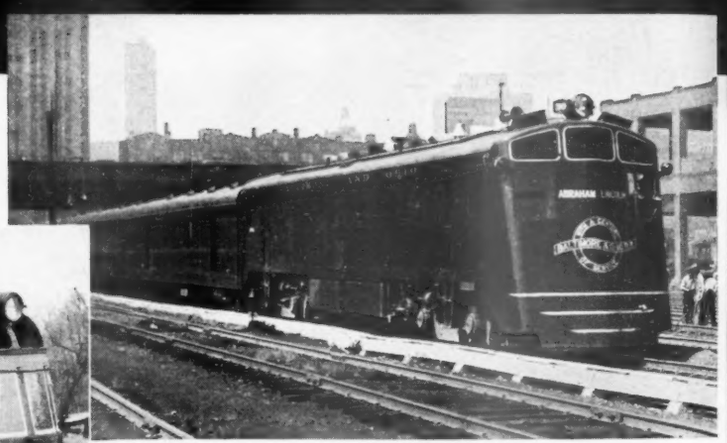
GRS

WHEN WILL YOUR ROAD JOIN THE LENGTHENING PARADE OF DIESEL-ELECTRIC TRAINS?

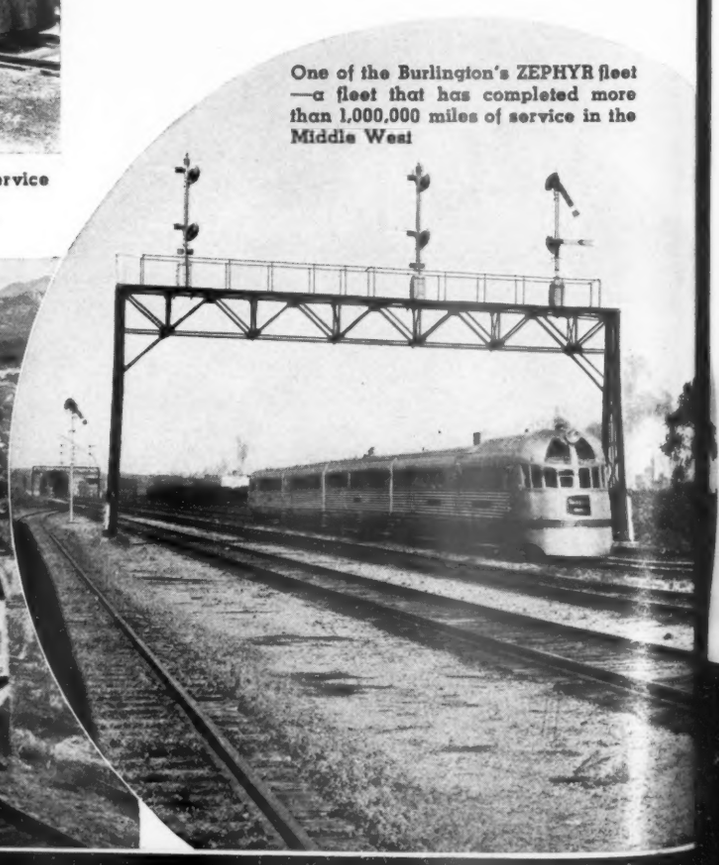
The diesel-electric trains shown on these pages are among those equipped with General Electric generators, traction motors, and controls

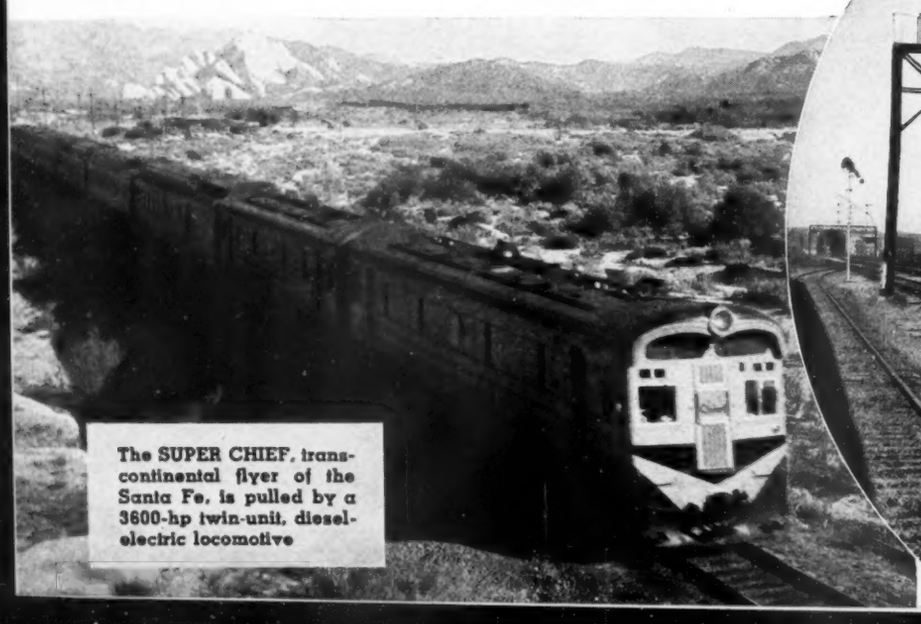


Baltimore & Ohio 1800-hp diesel-electric pulls the Alton's high-speed ABRAHAM LINCOLN between Chicago and St. Louis

The Seaboard Air Line has two of these 600-hp diesel-electrics in service between Wilmington - Hamlet - Charlotte - Rutherfordton

One of the Burlington's ZEPHYR fleet —a fleet that has completed more than 1,000,000 miles of service in the Middle West





The SUPER CHIEF, transcontinental flyer of the Santa Fe, is pulled by a 3600-hp twin-unit, diesel-electric locomotive

One of the Union Pacific's new 2400-hp STREAMLINERS, which operate between Chicago and the principal cities of the West

New England's first streamlined, high-speed diesel-electric train, the FLYING YANKEE on the Boston & Maine

DIESEL-electric motive power has definitely established its position as unexcelled for fast passenger service. The public is attracted and held by the luxurious comfort and high speed of these trains. Operators are gratified by the inherent operating economies.

Amazing mileage records are being piled up by diesel-electrics. From Chicago to the Pacific—a few hours layover and back again. Not several locomotives, each running from division point to division point, but ONE motive-power unit, operated thousands upon thousands of miles a month—always on the job. Or on shorter runs—hundreds of miles a day, every day, winter or summer—and holding down the costs. Add the factor of average speeds of more than a mile a minute, and you'll agree when we say that diesel-electrics "do more work."

The importance of the performance of their electric equipment must not be overlooked. Without generators, motors, and controls which are properly designed and built to withstand the wear and tear of high speeds and continuous operation, the use of diesel power would not be possible—because electric drive is the ONLY practical method of transmitting the power of diesel engines, smoothly and reliably, to the wheels.

In the West and Midwest, in the East and South, diesel-electric motive power is showing the way to new highs in passenger revenues. You can speed up schedules; you can build traffic; you can do more work—day in and day out; you can cut operating costs and reduce maintenance. When will your road enjoy the advantages of this new motive power? Join the parade and watch your passenger revenues grow. General Electric, Schenectady, N. Y.

The GREEN DIAMOND, crack diesel-electric train of the Illinois Central, makes a round trip daily between Chicago and St. Louis

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Schenectady, N. Y.

Please send your new illustrated booklet "Parade of Modern, High-speed, Diesel-electric Trains," GEA-1928.

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★From ore mine to shipping platform YOUNGSTOWN Pipe is the product of a single organization. Complete control of materials and processes plus a rigid and intensive inspection system insures highest quality pipe. You avoid uncertainty when you standardize on YOUNGSTOWN Pipe and you profit from its consistent uniformity.

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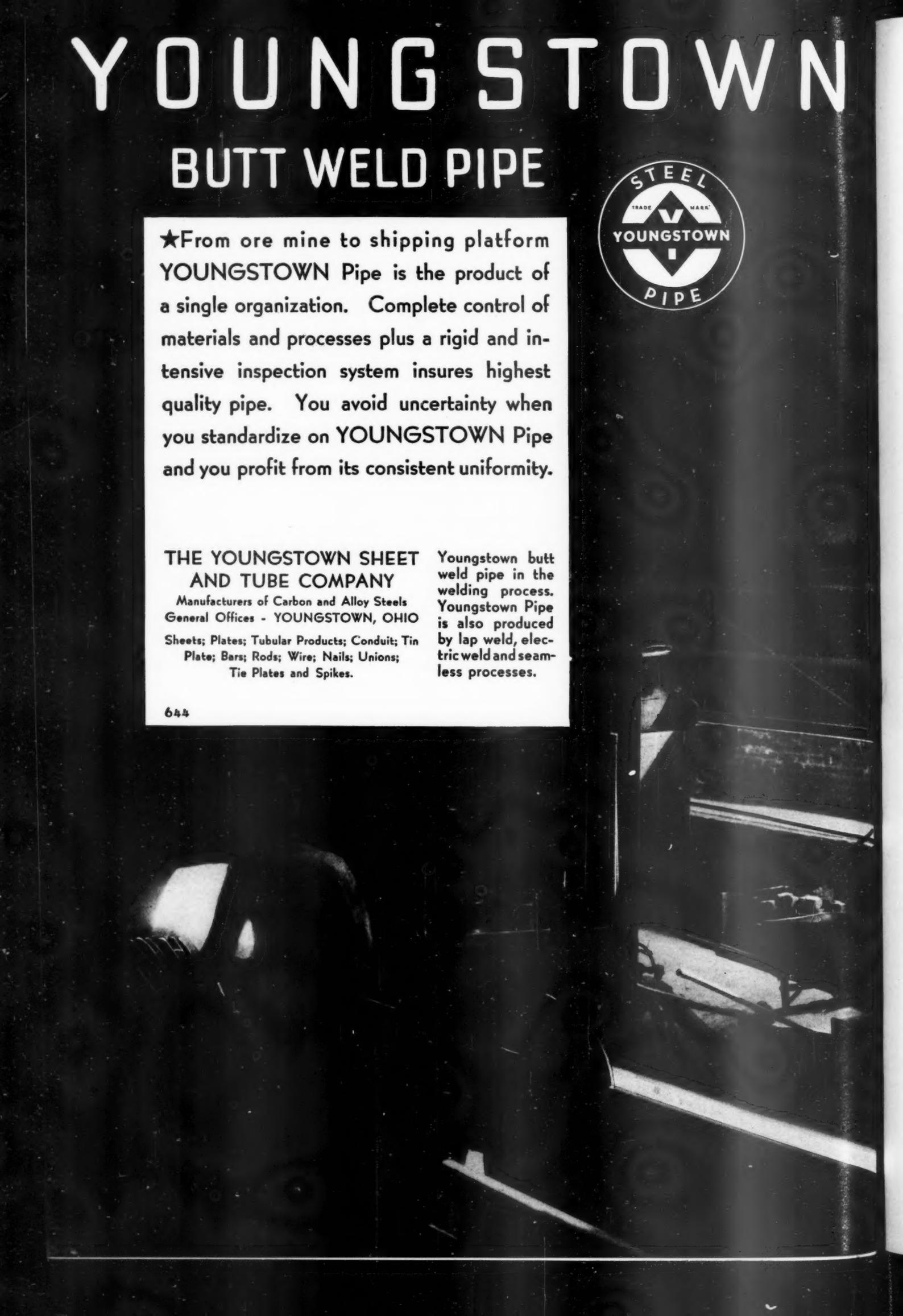
Sheets; Plates; Tubular Products; Conduit; Tin Plate; Bars; Rods; Wire; Nails; Unions; Tie Plates and Spikes.

Youngstown butt weld pipe in the welding process. Youngstown Pipe is also produced by lap weld, electric weld and seamless processes.

644



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CAN SERVE YOUR NEEDS FOR COMMON SHEETS AS WELL AS SPECIALTIES

It's true that in the railroad field and others Armco is noted for its special flat-rolled steels.

ARMCO Stainless Steels, H.T. 50, Chromsteel (R. R. 11), and Ingot Iron have become widely used and preferred because they best meet specific applications.

Yet, even so, your order for hot-rolled sheets and plates, cold-rolled sheets and galvanized sheets gets the same careful attention and interest given the special grades. And when your purchase is marked RUSH, it's reassuring to know that the steel will be rolled on Armco-invented continuous mills. This means uniform good quality as well as prompt delivery.

ARMCO Hot-Rolled Sheets, Strip and Plates provide every requisite you demand—a variety of surface finishes, splendid ductility and the finest welding quality. ARMCO Cold-Rolled Sheets and Strip are characterized by flawless surface and excellent drawing properties or workability. Both grades hold paint well. ARMCO Galvanized Sheets may be specified in Ingot Iron, copper-bearing and plain steel bases, and the coatings are generous, adherent and protective.

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Subsidiary of The American Rolling Mill Co.
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Exide
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Capture **A TRAIN-LOAD OF THIS AIR**

The benefit to be derived from passenger-car air-conditioning depends directly upon the improved comfort it offers . . . combined with the cost of operation.

Experience shows that the batteries you use have an important bearing on the performance and economy of the service. By using Exide-Ironclad Batteries, you are sure of reserve power ample for the most difficult conditions . . . of uninterrupted service and complete dependability.

Equally important, a minimum of attention keeps these batteries steadily on the job throughout their long, trouble-free life. That is why they have contributed so greatly to the excellence and low cost of railway air-conditioning.

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
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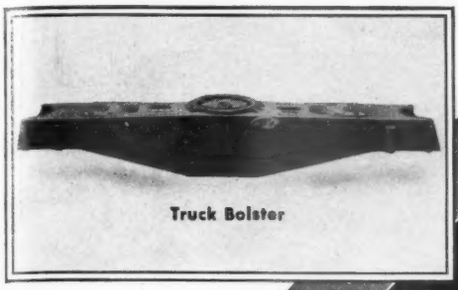
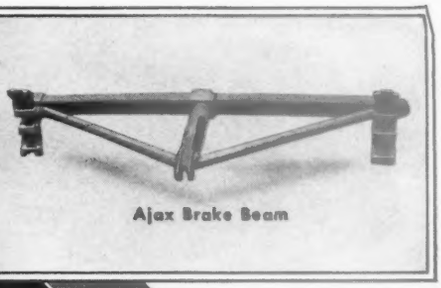


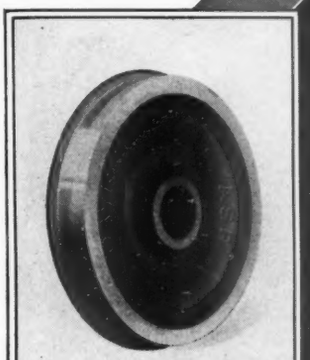
Truck Bolster



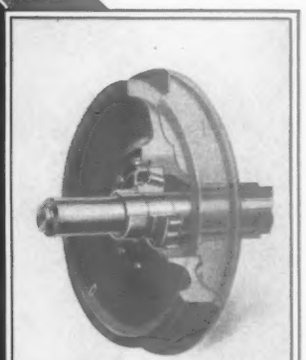
Ajax Brake Beam

THE American Steel Foundries for more than a third of a century has been developing cast steel devices, the use of which by the railroads has resulted in greater economy of operation.

Long experience in the manufacture of uniformly good steel castings, the combined skill of metallurgists and foundrymen familiar with the needs of railway and industrial equipment, prompt shipment from strategically located plants, a world wide reputation for integrity and fair dealing: — these are some of the things which have tended to make the American Steel Foundries a leader in the steel casting industry.



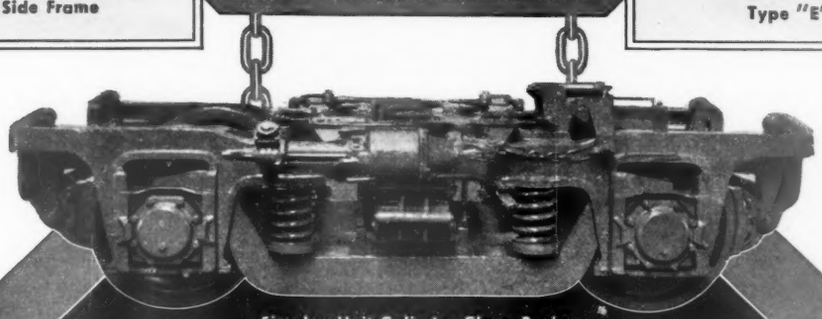
Davis Heavy Service Steel Wheel



Roller Bearing Unit

Cast Steel Truck Side Frame

Type "E" Coupler



Simplex Unit Cylinder Clasp Brake

Coil & Elliptic Springs

The American Steel Foundries is proud to be serving a transportation industry that demands the best inventive and producing talent and that reaches out for devices that are new and better.

Janney Vertical Key Yoke

AMERICAN STEEL FOUNDRIES

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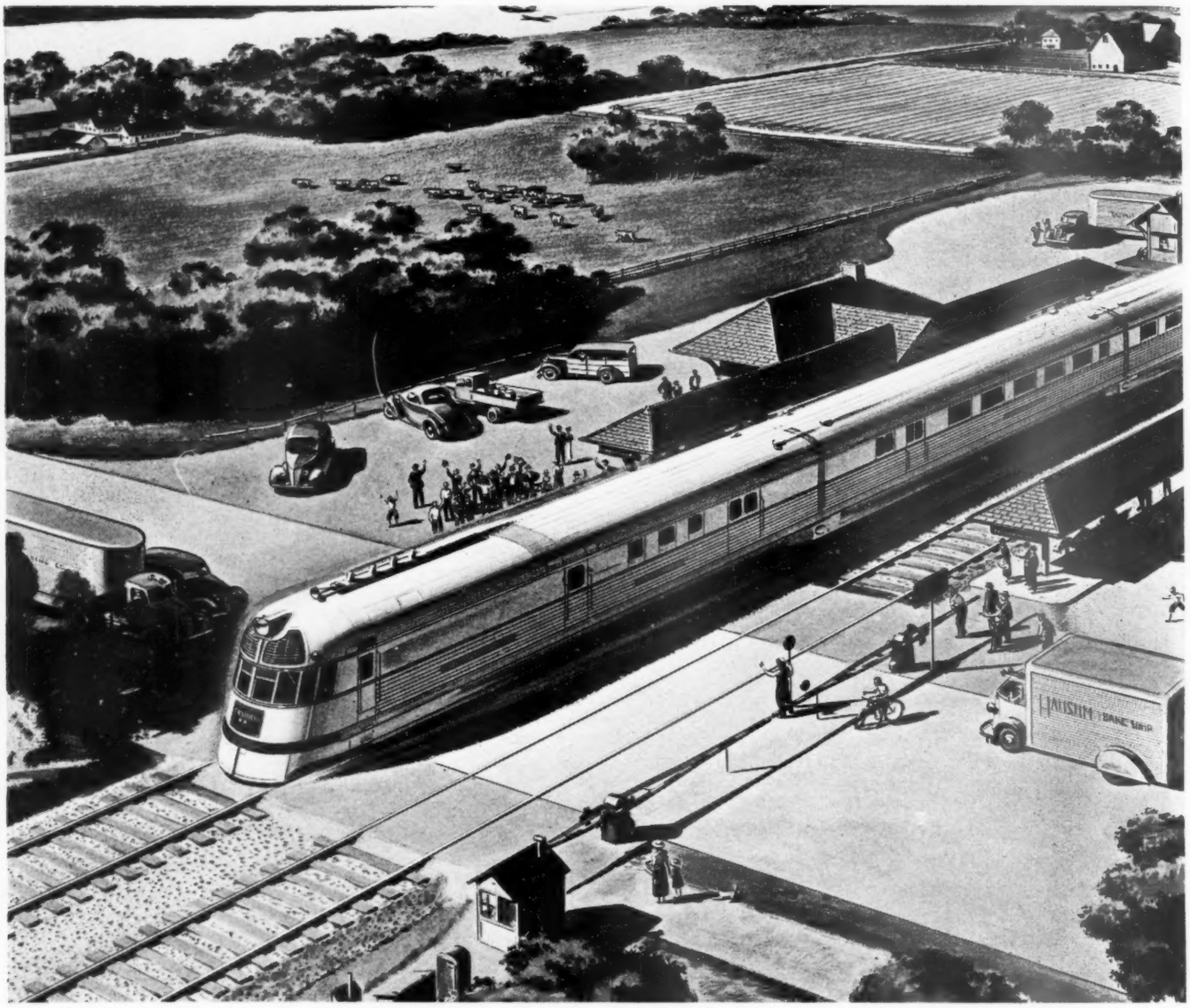

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EVERY DAY at five o'clock it hums by at eighty miles an hour. Sleek and gleaming, this train of stainless steel brings a fresh thrill to the countryside. Millions, seeing it, sense a new impulse that has come to the rails. For this swift, smooth thing of beauty is not just another train. It is the embodiment of the new principle that is bringing about the revolution in all forms of transportation.

The old-fashioned idea that safe construction can only be obtained by massiveness was first disproved by automotive engineers and the designers of modern aircraft. Metallurgists opened up endless possibilities by producing new alloys, incomparably stronger than the traditional forms of steel and iron. Most notable is stainless steel—beautiful, noncorrosive, possessing four times the elastic strength of ordinary steel.

With stainless steel, Budd builds trains that have already traveled more than a million miles in practical and profitable operation—bringing new life and increasing popularity to railroad travel.

And they operate profitably with fares at 2c a mile!

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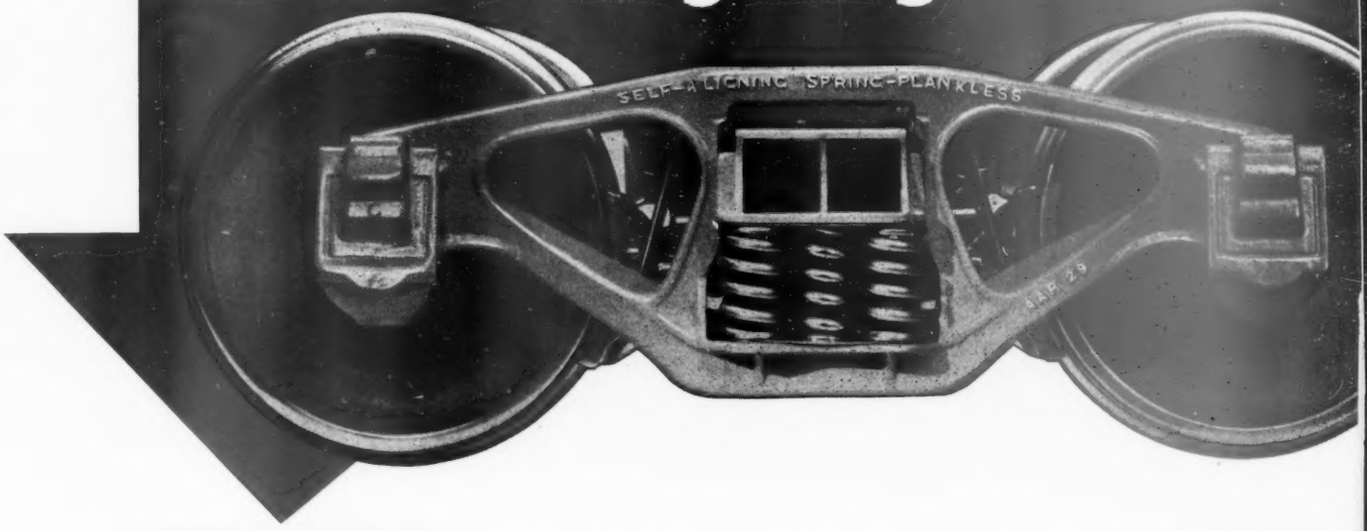
Do you want the inside story of Budd-built Streamlined Trains? . . . Let us send you: "The Conquest of Weight."

EDW. G. BUDD MANUFACTURING COMPANY

RAILWAY DIVISION, PHILADELPHIA

BUDD METHODS SAFELY ELIMINATE DEAD-WEIGHT

Consider these 5 features of Self-Aligning trucks



Lightest weight possible. Minimum number of parts. Lower maintenance and operating costs. Lower first cost. Approved by A.A.R.

Side Frame — Tested and approved standard construction. Full strength with less weight.

Bolster — Standard full box section throughout, including the important spring-seat sections.

Spring Seat — Open, one-level. Simplifies inspection, wheel removals and shimming . . . permits easy application of all coil, "Coil-Elliptic," coil snubber or other spring combinations.

Brake Support — Any approved support or guard may be applied . . . supporting brackets cast integrally with side frame without charge.

Bolster-side frame connection — wide cylindrical areas always completely in contact insure long wear.

PITTSBURGH STEEL FOUNDRY CORP.
GLASSPORT, PENN.
Licensed Manufacturer of Self-Aligning Trucks

SELF-ALIGNING TRUCKS

spring-plankless double-truss

UTILIZE DESIGNS OF PROVED DEPENDABILITY

THE GLOUCESTER FISHERMAN GOES A-TRAVELING

● With salt water dripping from his glittering oilskins, and the tang of the North Atlantic still about him, the old fisherman visits your table a thousand, two thousand miles from seaboard. He brings you fresh from the nets the delicacies of ocean and brackish bay.

Sped safely over gleaming lines of steel from distant fishing ports, this miracle of shipping was undreamed of a half century ago. Yet the steady development and improvement of refrigerated railroad cars has made delivery of ocean-fresh seafood a commonplace everywhere.

It has been over half a century since the antecedents of American Hair & Felt Co. and Dry-Zero Corporation were first called upon by the railroads to contribute to refrigerated rail transport. During the ensuing years the roads have worked marvels in the transport of perishables and these affiliated insulation companies have aided in every step with improved insulating materials. It is significant that they have supplied the insulating materials for almost all the railroad refrigerator cars now in service.

HAIRINSUL — Standard refrigerator car insulation.

DRY-ZERO — The most efficient and lightest weight low temperature insulation known — standard for low temperature cars.

SALAMANDER — For over 30 years the standard insulation for passenger cars.

LIGHT-WEIGHT SALAMANDER — For insulating light-weight, high speed passenger cars.

CARINSUL — Made especially for insulating the letter board of passenger cars.

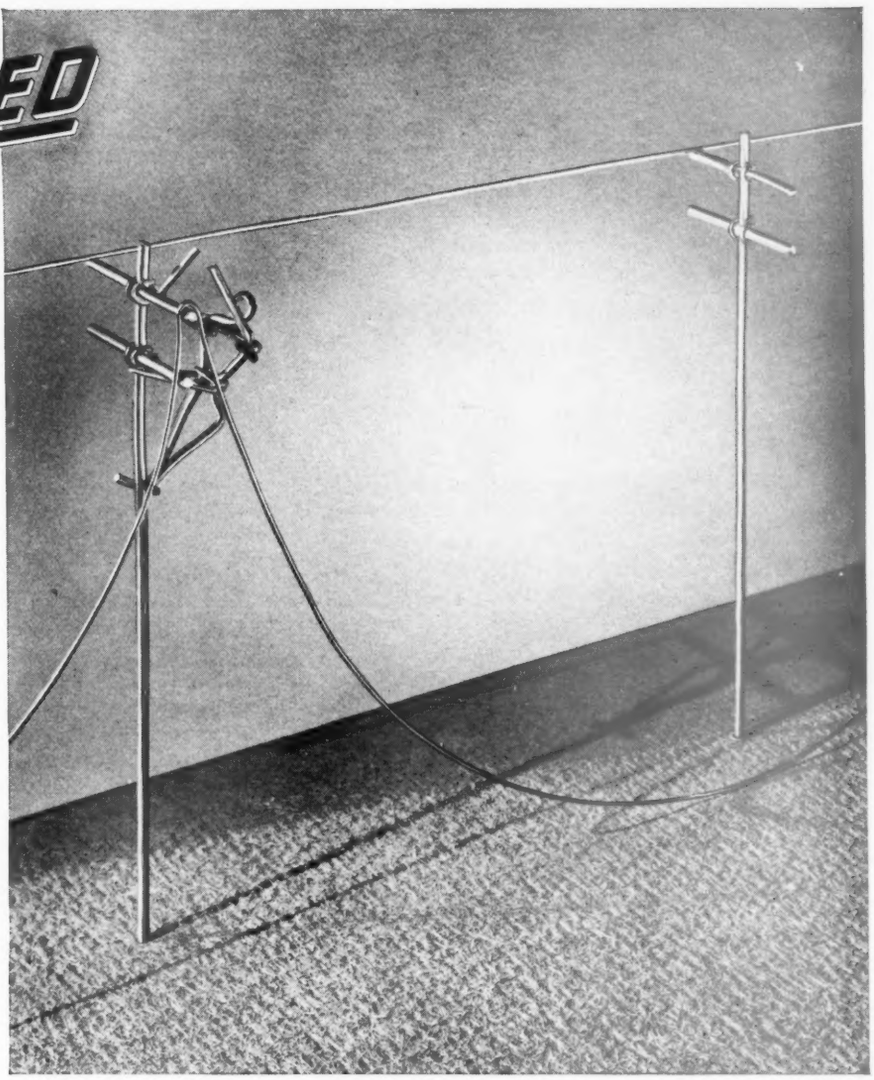
OZITE STANDARD HAIR FELT — Made by the genuine original platen or felted process and universally recognized as the highest standard of felted insulation.

LIGHT-WEIGHT AIR CONDITIONING HAIR FELT — For insulating air ducts.

DRY-ZERO ECONOMY ICE BLANKET — For reducing ice meltage on platforms and in transit.

AMERICAN HAIR & FELT COMPANY • DRY-ZERO CORPORATION
(Railroad Division)
Merchandise Mart Chicago

BETHANIZED WIRE



Wiregraph by Alexander Calder, made of Bethanized Wire

for Railway Telegraph Lines

BETHANIZED wire is dependable wire for railway telegraph lines. There are no treacherous thin places in the bethanized coating to cause early rusting and the unexpected failure of service that sometimes occurs in galvanized wire of the ordinary kind.

The bethanized coating is electrically deposited on the wire with absolute uniformity of thickness, and is superior to coatings applied by older galvanizing processes in many ways. This new kind of zinc coating is so ductile and tightly adherent that bethanized wire carrying a weight of coating two or three times heavier than ordinary galvanizing can be wrapped around its own diameter or even bent back flat on itself without flaking or scaling. This is insurance against impairment of protection from abuse in handling or erecting.

Another outstanding advantage in railway telegraph service is the high purity of the bethanized coating. It is the purest zinc coating ever commercially produced, actually 99.99 per cent pure. It is so pure that it is practically immune to attack by the sulphur gases that are so active in hastening the weathering away of galvanizing of older types in railway service.

Other applications in which bethanized wire is decreasing frequency of replacement are right-of-way fence, strand and bond wire in electrified systems, and as signal and semaphore wire.

In the same coating weights, bethanized wire is no more costly than other galvanized wire, and but little more expensive in heavier coatings. We will gladly assist in determining the coating weight and grade of bethanized wire best adapted to any given conditions in railway service.

BETHLEHEM STEEL COMPANY, *General Offices:* Bethlehem, Pa. *District Offices:* Albany, Atlanta, Baltimore, Boston, Bridgeport, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Hartford, Honolulu, Houston, Indianapolis, Kansas City, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Portland, Ore., Salt Lake City, San Antonio, San Francisco, St. Louis, St. Paul, Seattle, Syracuse, Washington, Wilkes-Barre, York. *Export Distributor:* Bethlehem Steel Export Corp., New York.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

Notice to Railway Signal Material Dealers

Sealed bids for the furnishing of materials for the use of railway companies in the installation of flashing light signals at highway-railroad grade crossings will be received by the Arkansas State Highway Commission at their office in Little Rock, Arkansas, until ten o'clock A.M., September 29, 1936, at which time they will be publicly opened and read.

The materials involved are for use by the following railway companies:

Chicago, Rock Island and Pacific	10 installations
Missouri Pacific	8 "
St. Louis and Southwestern	3 "
Texas and Pacific	1 "

Proposal forms covering quantities, specifications and full information may be secured from the office of the State Highway Commission, Little Rock, Arkansas.

NOTICE TO CONTRACTORS

Job No. 4220

Sealed bids for the furnishing and installing Railroad Warning Signals on Wheeler Avenue, Fort Smith, Arkansas, U. S. Works Program Grade Crossing Project No. 433-A, City Street, Sebastian County, will be received by the Arkansas State Highway Commission at their office in Little Rock, Arkansas, until ten o'clock A.M., September 29, 1936, at which time they will be publicly opened and read.

The proposed project consists of flashing light type, Railroad Warning Signals at the Wheeler Avenue crossing of the Ft. Smith and Western Railroad in Fort Smith, Arkansas.

The successful bidder will be required to complete the contract in 90 calendar days. The proposal guarantee must consist of either a bidder's bond or a certified or cashier's check in the amount of $1,000.00.

Job No. 1163

Sealed bids for the furnishing and installing Railroad Warning Signals at HARRISON, URBANETTE, LESLIE AND DIXIE on the Missouri and Arkansas Railroad, U. S. Works Program Grade Crossing Project No. WPGM 431-A, WPGS 432-A, WPGM 431-B and WPGS 432-B, State Highways 43, 21, 66 and 33, Sections 3, 6, 1, and 4, Boone, Carroll, Searcy and Woodruff Counties, will be received by the Arkansas State Highway Commission at their office in Little Rock, Arkansas, until ten o'clock A.M., September 29, 1936, at which time they will be publicly opened and read.

The proposed project consists of flashing light type Railroad Warning Signals at the Missouri and Arkansas Railroad crossings in Harrison, Urbanette, Leslie and Dixie.

The successful bidder will be required to complete the contract in 120 calendar days. The proposal guarantee must consist of either a bidder's bond or a certified or cashier's check in the amount of $1,000.00.

The attention of bidders is directed to the Special Provisions covering subletting or assigning the contract and to the use of domestic materials.

The minimum wage paid to all skilled labor employed on Job 4220 shall be fifty cents per hour. The minimum wage paid to all labor, intermediate grade, shall be thirty-five cents per hour. The minimum wage paid to all unskilled labor shall be twenty-three cents per hour.

The minimum wage paid to all skilled labor employed on Job 1163 shall be fifty cents per hour. The minimum wage paid to all labor, intermediate grade, shall be thirty-five cents per hour. The minimum wage paid to all unskilled labor shall be twenty cents per hour.

Plans and Specifications may be examined at the office of the State Highway Commission, Little Rock, Arkansas.

The Instructions to Bidders carried in the proposal form must be complied with.

Dave Block, Chairman
Arkansas State Highway Commission

Rebuilt Cars are Not Just as Good as New

COVERDALE & Colpitts, in discussing the adequacy of old equipment for present traffic requirements, make the following statements in their report on the "Economic Aspects of the Freight Car Situation".

"In connection with any proposed rebuilding program, it should be pointed out that arch bar trucks must be replaced by cast steel trucks under the present Association of American Railroads ruling requiring replacements of all arch bar type of trucks by January 1, 1938. Further, A. B. brakes will be required on all cars in interchange after January 1, 1945, which would entail a further additional cost of approximately $150. per car. Any of these older cars too, when rebuilt, would still retain many features of construction and equipment which are inadequate in their protection to cars, lading and roadbed, when compared to what is offered in present-day type of construction.

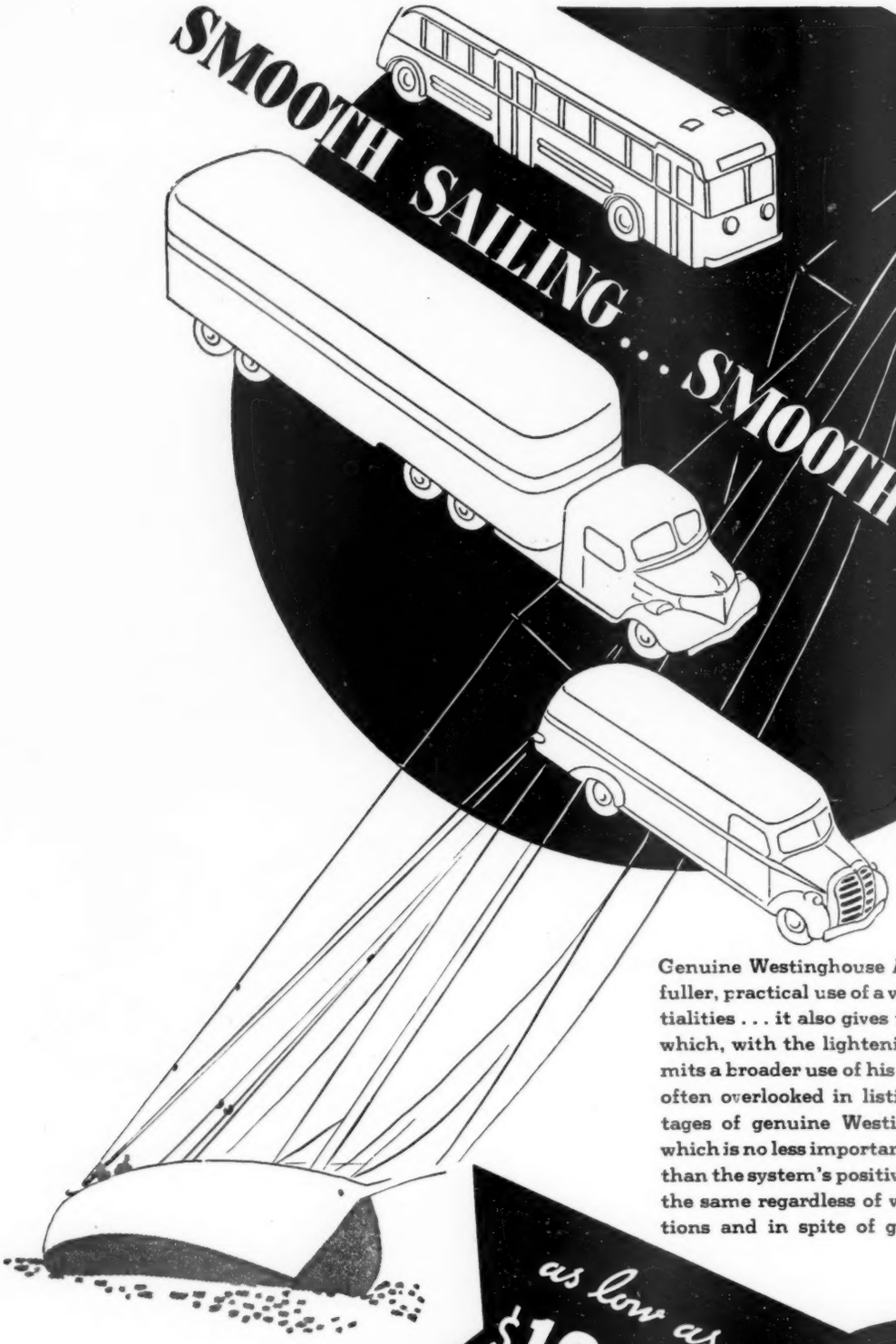
"It is in the new, not the rebuilt car that it is possible to obtain the most modern design and construction of body, underframe and trucks."

And that means more economical operation—the logical reason why new cars, right now, are an investment of the highest class.

American Railway Car Institute

19 Rector Street New York, N. Y.

SMOOTH SAILING . . . SMOOTH STOPPING



Genuine Westinghouse Air Control not only permits a fuller, practical use of a vehicle's speed and power potentialities . . . it also gives the operator a sense of security which, with the lightening of his physical burden, permits a broader use of his own capabilities • Here is a fact often overlooked in listing the many exclusive advantages of genuine Westinghouse Air Control and one which is no less important from an economic standpoint than the system's positive power-to-stop which is always the same regardless of vehicle weights, climatic conditions and in spite of gruelling schedule impositions.

as low as $139.00 INSTALLED

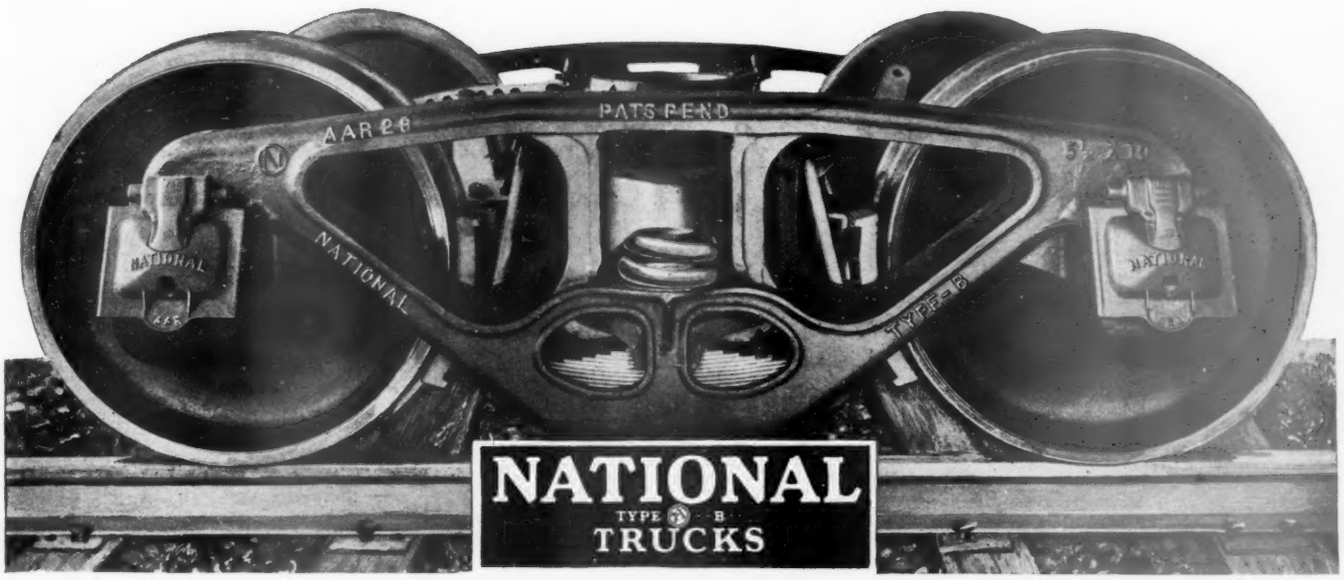
Genuine WESTINGHOUSE AIR BRAKES

★

• The usefulness of Westinghouse Air Brakes rarely ends with their first installation. Transferring the system from old to new vehicles is an established practice among operators who recognize through experience the unusually long dependable life of genuine Westinghouse Equipment.

BENDIX-WESTINGHOUSE AUTOMOTIVE AIR BRAKE CO. • PITTSBURGH, PENNSYLVANIA

THE LEADING



SPRING - PLANKLESS TRUCK

Over Five Years Of Satisfactory Service

ONE of the chief objectives in the design of the National Type B Truck was the elimination of the spring plank. This improved design not only reduced the weight and number of parts, but produced a more flexible truck.

Other outstanding points that provide savings from an operating standpoint are: Quick wheel changes—unique spring suspension, which gives better riding and less spring cost—self squaring features—brake beam safety ledges cast integral with frame—spring cushioned lateral blows—water ledge on journal box—strong bolster with trunnions that provide a substantial cross tie.

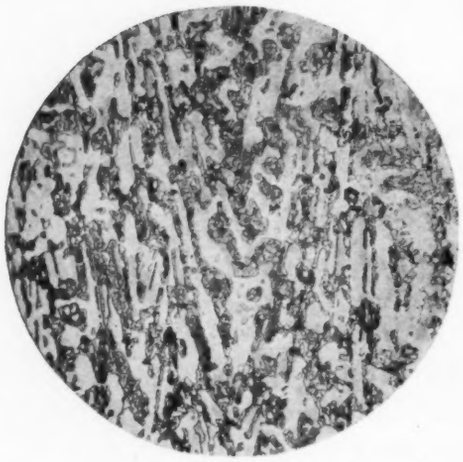
Due to its simplified design, the National Type B Truck weighs less than ordinary trucks. Positive savings produced by this truck make it one to be preferred for modern equipment.

NATIONAL MALLEABLE AND STEEL CASTINGS CO.
General Offices: CLEVELAND, OHIO
Sales Offices: New York, Philadelphia, Chicago, St. Louis, San Francisco
Works: Cleveland, Chicago, Indianapolis, Sharon, Pa., Melrose Park, Ill.

Canadian Representatives: Railway and Power Engineering Corporation, Ltd., Toronto and Montreal

METALLURGY

Chilled Metal x 100



Chilled Metal x 400

Plate Metal x 100

AND THE CHILLED CAR WHEEL

THE micro examination of metal is the most valuable single method by which heat treatment can be studied. The metallurgical staff of the Association of Manufacturers of Chilled Car Wheels has made valuable contributions to the study of the micro structure of chilled car wheels and its relation to strength and service performance. The accompanying micrographs are typical of the structure found in the chill and plate of chilled car wheels. The well-founded heat treatment accorded chilled car wheels yields the uniformly fine structure evidenced by these microphotographs.

MEMBERS

Albany Car Wheel Co.
American Car & Fdry. Co.
Bass Fdry. & Machine Co.
Canada Iron Foundries, Ltd.
Canadian Car & Fdry. Co.
Central Car Wheel Co.
Cleveland Production Co.
Dominion Wheel & Fdries., Ltd.
Griffin Wheel Co.
Hannibal Car Wheel & Fdry. Co.
Lobdell Car Wheel Co.
Louisville Car Wheel & Ry. Sup. Co.
Marshall Car Wheel & Fdry. Co.
Maryland Car Wheel Co.
Mt. Vernon Car Mfg. Co.
New York Car Wheel Co.
Pullman-Standard Car Mfg. Co.
Ramapo Fdry. & Wheel Works
Reading Car Wheel Co.
Southern Wheel Co.
Tredegar Iron Works

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS
445 N. Sacramento Blvd. CHICAGO, ILLINOIS

● *Investigate their advantages for trestle renewals — track elevations — grade separations — bridge approaches*

Study the L&N's track elevation program at Louisville — where *nineteen miles* of reinforced concrete 24-in. piles are being used. Here and on other jobs you'll find—

Low Manufacturing Costs. Modern casting yard methods result in surprisingly low costs per linear foot of pile.

Lower Cost per Ton Capacity. Each 24-in. pile has triple the load capacity of a small pile yet drives as easily and quickly.

Fewer Piles Needed. A 3-pile concrete trestle has less than half as many piles as the old trestle it replaces.

Fewer Driving Delays. No stringer shifting! Three to five bents per 8-hour day can be driven without traffic interruption.

Further Savings in Deck. Concrete caps are cast without removing old trestle deck. 3 to 6 precast deck panels placed per day.

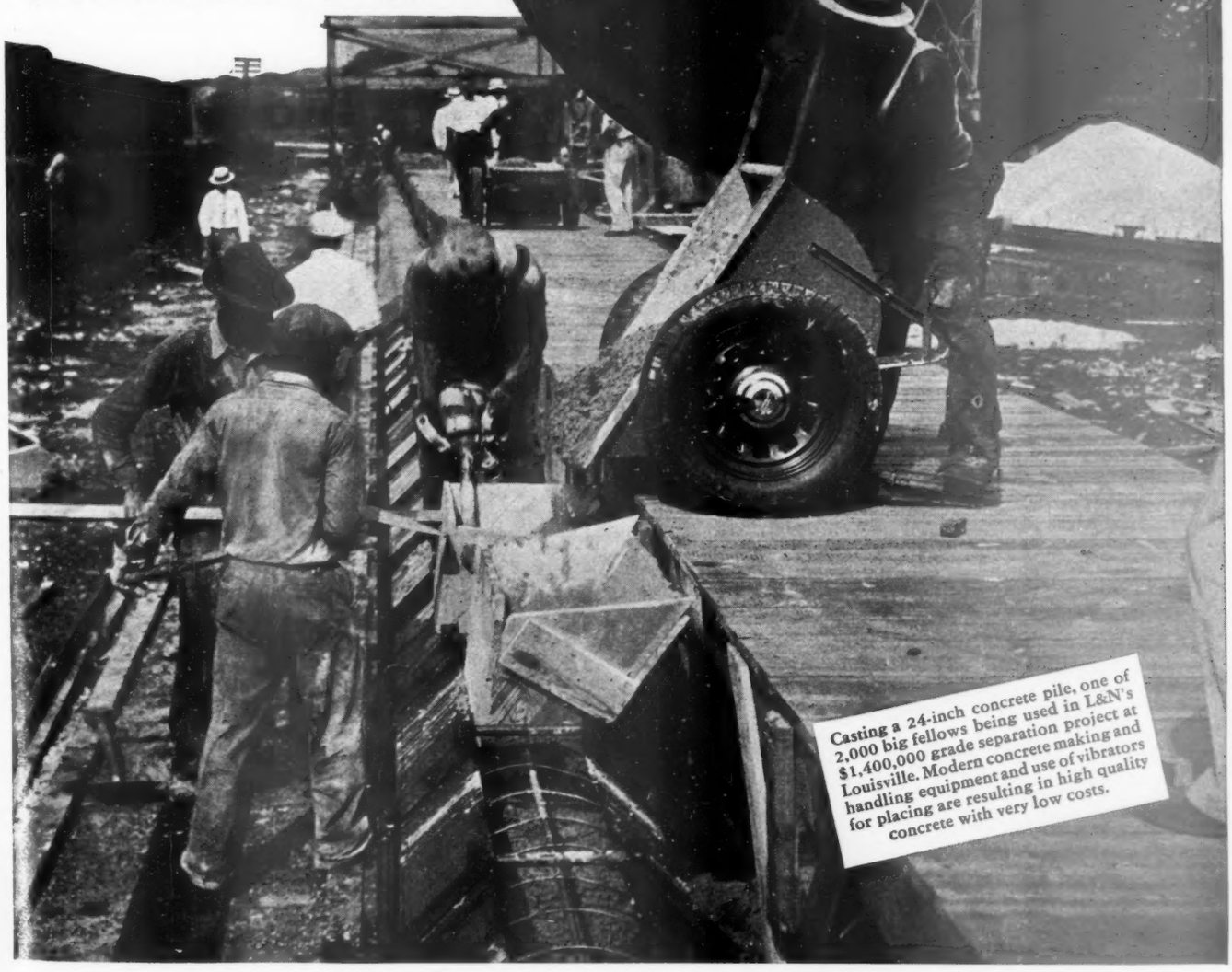
AND: Permanence, Firesafety, flood resistance and great reserve strength—at low first cost and lowest annual cost of any comparable construction. Write—

PORTLAND CEMENT ASSOCIATION
Dept. A9-d-26, 33 W. Grand Ave., Chicago, Ill.

Again

PROVING THEIR ECONOMY

BIG CONCRETE PILES



Casting a 24-inch concrete pile, one of 2,000 big fellows being used in L&N's $1,400,000 grade separation project at Louisville. Modern concrete making and handling equipment and use of vibrators for placing are resulting in high quality concrete with very low costs.

$20,000,000

Union Pacific Railroad Company

Thirty-Four Year 3½% Debenture Bonds

To be dated October 1, 1936 **To be due October 1, 1970**

Redeemable as a whole, but not in part, at the option of the Company, upon not less than forty-five days' published notice, on October 1, 1941, or on any interest date thereafter up to and including October 1, 1946, at 103%; thereafter up to and including October 1, 1951, at 102½%; thereafter up to and including October 1, 1956, at 102%; thereafter up to and including October 1, 1961, at 101½%; thereafter up to and including October 1, 1966, at 101%, and thereafter at 100%, in each case with accrued interest.

The issue and sale of these Bonds are subject to the approval of the Interstate Commerce Commission and all legal proceedings in connection with the issue and sale thereof are subject to the approval of counsel for the undersigned.

CHEMICAL BANK & TRUST COMPANY, Trustee

In the opinion of counsel, these Bonds are legal investments for savings banks under the laws of New York, Pennsylvania, California and Rhode Island.

Copies of the circular dated September 18, 1936, describing these Bonds and giving information regarding the Company, may be obtained from the undersigned on request.

OFFERING PRICE 99½% AND ACCRUED INTEREST

Subject as aforesaid the Company has agreed to sell and Kuhn, Loeb & Co. have agreed to purchase the above Bonds at 97½% and accrued interest to date of delivery. The undersigned reserve the right in connection with the marketing of these Bonds, or otherwise, to purchase or sell these Bonds or other securities of the Company in the open market or otherwise. Temporary bonds or interim receipts of the Company, exchangeable for definitive bonds when prepared, may be delivered in the first instance. The Company has agreed to make application in due course to list the Bonds on the New York Stock Exchange.

Kuhn, Loeb & Co.

New York, September 18, 1936.

LIFE TIME TIMBER STRUCTURES

ERECTED AT A MINIMUM COST

Several hundred millions have been set aside for highway and railway grade crossing elimination. This vast sum will only be sufficient to eliminate a very small percent of the grade crossings in this country. The problem confronting Government, State and Railway officials is, therefore, one of distributing these funds in such a way as to eliminate the greatest possible number of crossings.

"Wood Preserving" full pressure creosoted Piling and Timbers, at moderate first cost and with established records for long and satisfactory service life, offer a solution for many of these grade crossing separation problems. Economical in initial cost and with low annual maintenance charges, creosoted Piling and Timbers are the logical material to use for maximum life time service.

THE WOOD PRESERVING CORPORATION KOPPERS

PRESSURE TREATED BRIDGE TIMBER
CROSS TIES . LUMBER . PILING . POLES

THE WOOD PRESERVING CORPORATION
KOPPERS BUILDING . . . PITTSBURGH, PENNA.

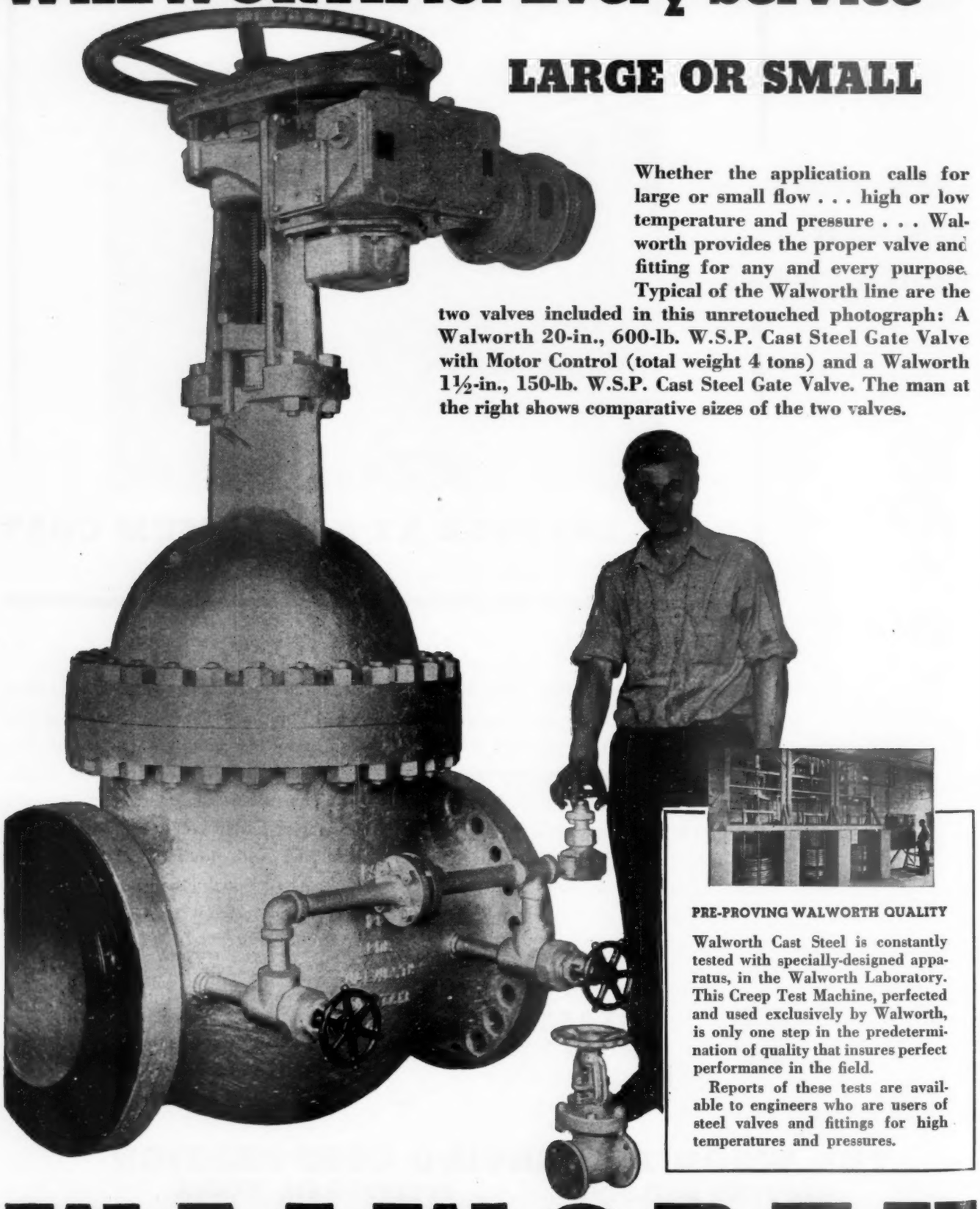
SALES OFFICES
Baltimore, Md.
Boston, Mass.
Charleston, S. C.
Chicago, Ill.
Denver, Colorado
Houston, Texas
Kansas City, Mo.
Memphis, Tenn.

AYER & LORD DIVISION CHICAGO, ILL.
CENTURY DIVISION PITTSBURGH, PA.
CAROLINA WOOD PRESERVING CO. CHARLESTON, S. C.
NATIONAL LUMBER & CREOSOTING CO. TEXARKANA, ARK-TEX.

SALES OFFICES
Montgomery, Ala.
New York, N. Y.
Philadelphia, Pa.
Pittsburgh, Pa.
Reed City, Mich.
St. Louis, Mo.
Superior, Wis.
Texarkana, Ark.

WALWORTH for Every Service—

LARGE OR SMALL



Whether the application calls for large or small flow . . . high or low temperature and pressure . . . Walworth provides the proper valve and fitting for any and every purpose. Typical of the Walworth line are the two valves included in this unretouched photograph: A Walworth 20-in., 600-lb. W.S.P. Cast Steel Gate Valve with Motor Control (total weight 4 tons) and a Walworth 1½-in., 150-lb. W.S.P. Cast Steel Gate Valve. The man at the right shows comparative sizes of the two valves.

PRE-PROVING WALWORTH QUALITY

Walworth Cast Steel is constantly tested with specially-designed apparatus, in the Walworth Laboratory. This Creep Test Machine, perfected and used exclusively by Walworth, is only one step in the predetermination of quality that insures perfect performance in the field.

Reports of these tests are available to engineers who are users of steel valves and fittings for high temperatures and pressures.

WALWORTH

WALWORTH COMPANY
60 EAST 42nd STREET, NEW YORK

VALVES FITTINGS and TOOLS
Backed by 94 Years' Service

DISTRIBUTORS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

What "Railway" Spring Service Means to You

IT means a reliable money-saving source of spring supply which will end all doubt about the quality and performance of your car and locomotive springs.

WHEN YOU PURCHASE "RAILWAY" SPRINGS—Right from the first preliminary design down to the final inspection of each finished unit—you are assured of thoroughly competent technical supervision—of expert and conscientious workmanship—and of the fact that each "Railway" Spring is produced with the aid of spring-making, heat-treating, testing and inspecting facilities, which are unexcelled—and to a large extent unequaled.

Backed by many years of experience in the economical production of quality springs, we are fully prepared in every respect to comply with railway spring specifications regardless of how special or intricate.

And the repair of broken springs receives the same skillful attention at "Railway" plants as the manufacture of new ones.

"RAILWAY"

AMERICAN LOCOMOTIVE COMPANY
RAILWAY STEEL SPRING DIVISION
30 CHURCH STREET · NEW YORK · N·Y·

PIONEERS

. . . but up-to-date

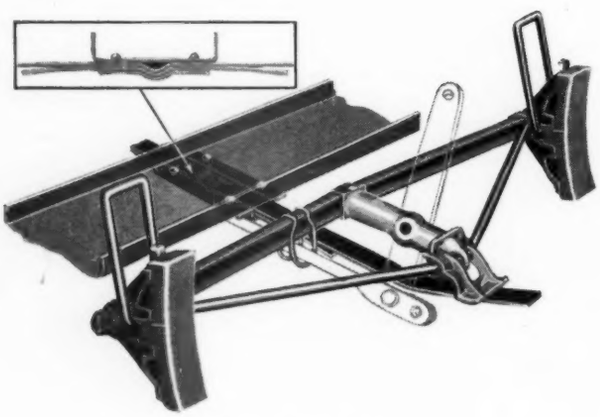
CRECO began making brake beam supports to protect railway brake rigging against vibration, and to safe-guard railway rolling stock against fallen brake beams.

Time and service on over 700,000 cars, have demanded only improvements in detail, but no change in fundamentals. CRECO Supports were engineered to conform to principle, and principle does not change.

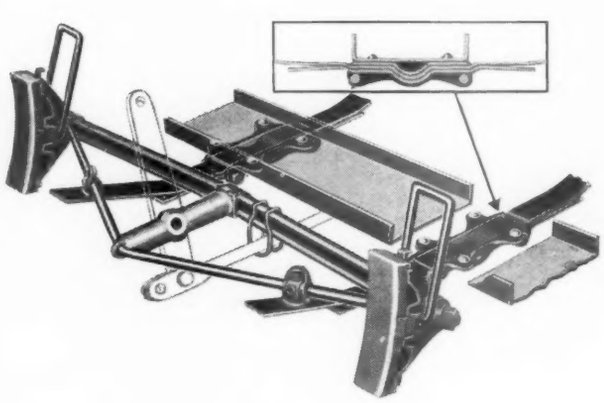
CHICAGO RAILWAY EQUIPMENT CO.

CHICAGO, ILLINOIS

Franklin, Pa. Marion, Ind. Montreal, Que. Grand Rapids, Mich.



Creco Third Point Brake Beam Support



Creco Four Point Brake Beam Support

CRECO BRAKE BEAM SUPPORTS

YOU WIN BOTH WAYS . . .

. . . with stainless steel equipment. Your train costs less to operate and it brings in more revenue.

These figures from a run where stainless steel trains operate 882 miles every day are typical: operating cost per train-mile cut from 71¢ to 32¢—every seat reserved for every trip—27% of all passengers represent additional fares *not diverted* from other trains.

Never forget that stainless steel is by far the strongest and most permanent of all modern alloys; and the *only* one which never costs a cent for painting, retains its sparkling newness year after year.

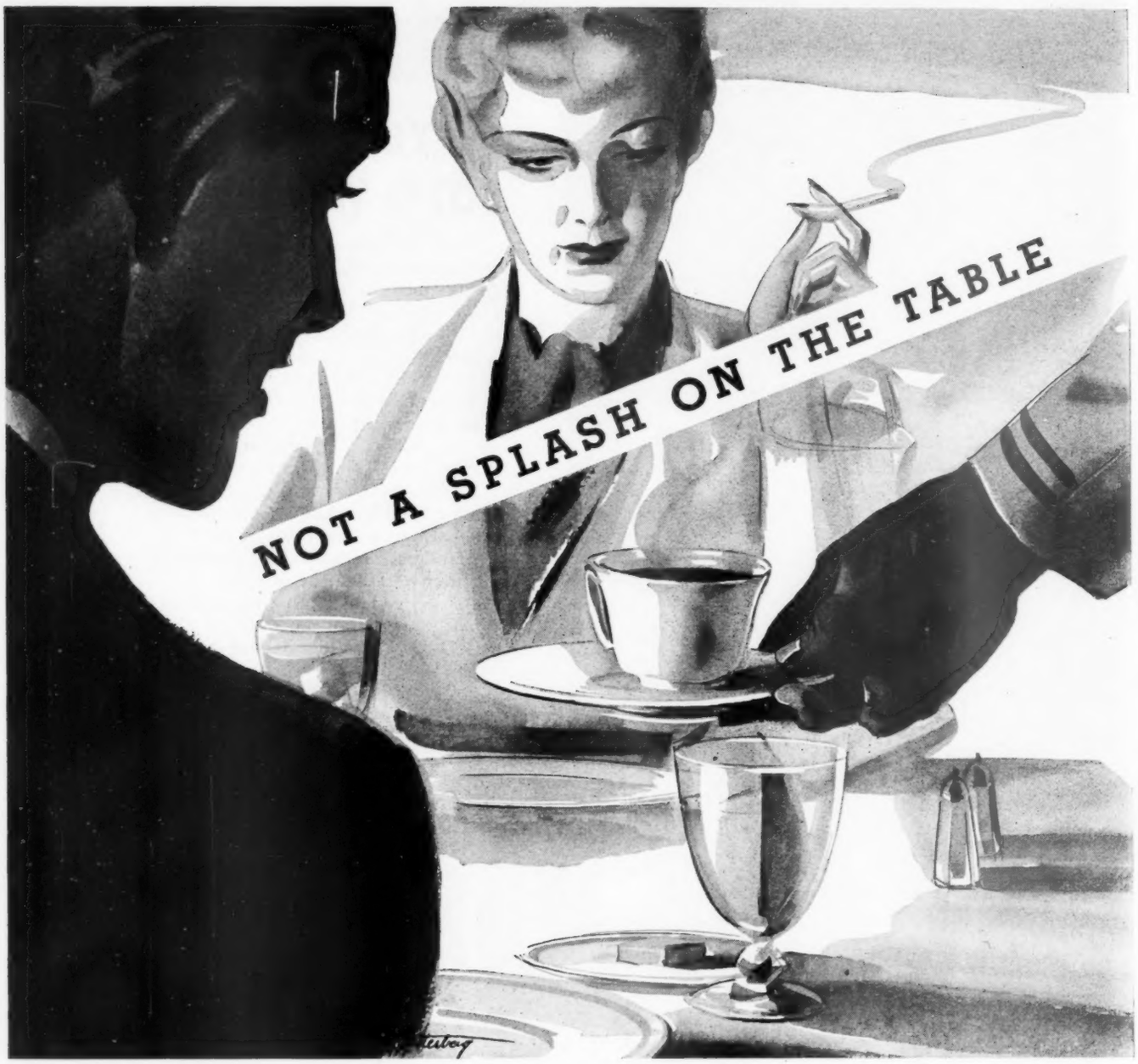
The train that glistens may not be gold . . . but how it sells tickets!

USS STAINLESS STEEL

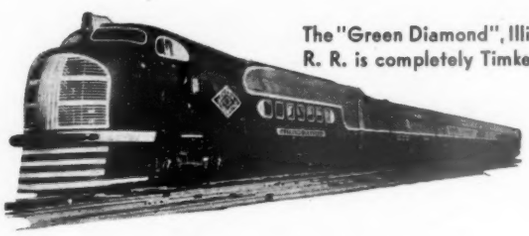
AMERICAN STEEL & WIRE COMPANY, *Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
NATIONAL TUBE COMPANY, *Pittsburgh*

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL



Passengers discover a new pleasure in eating when they breakfast, lunch or dine in a modern air-conditioned dining car rolling smoothly along on Timken Bearings. It is so solid and hotel-like that even the most timid travellers are reassured and really enjoy their meals while speeding at eighty, ninety or even one hundred miles an hour! Dining car comfort is only one of the irresistible attractions with which modern high-speed smooth rolling Timken Bearing Equipped trains are restoring patronage and profit to their operators.

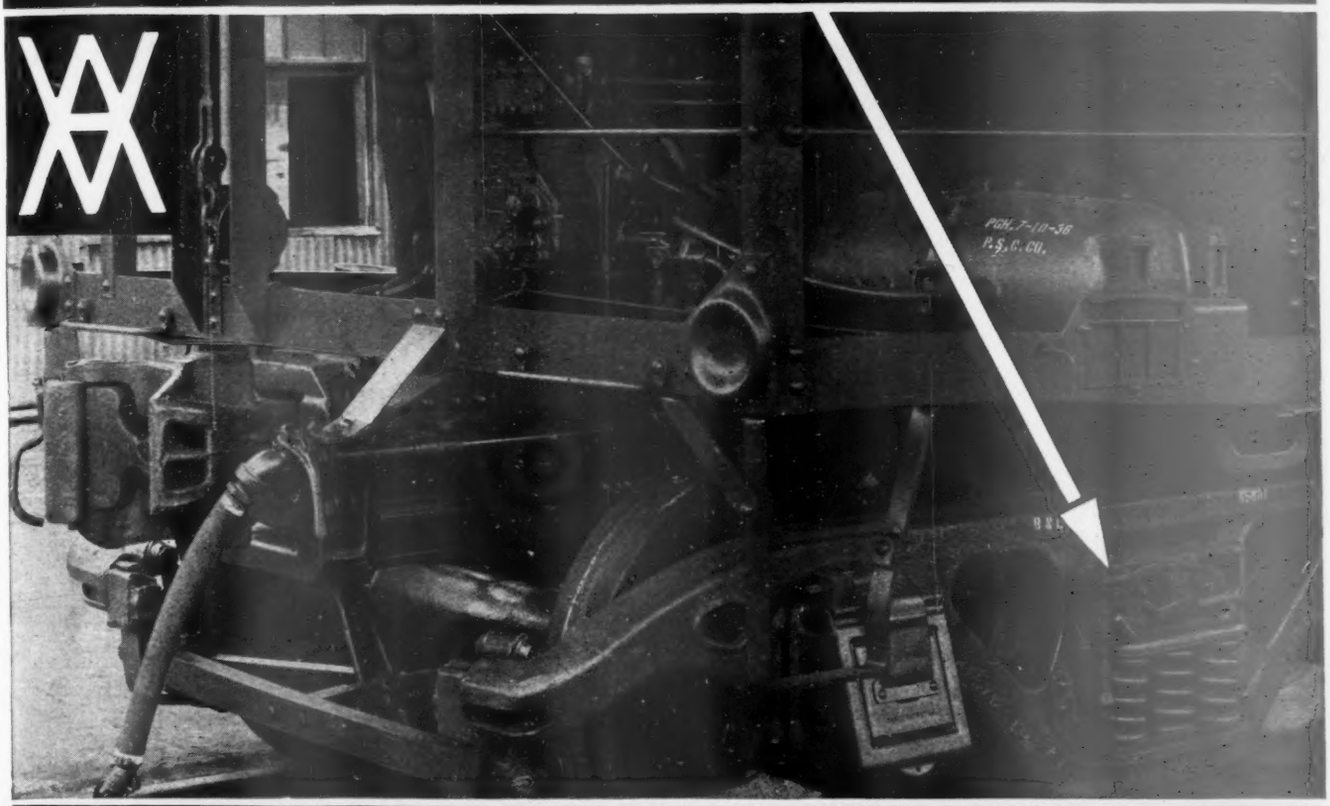


The "Green Diamond", Illinois Central R. R. is completely Timken-equipped.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN TAPERED ROLLER BEARINGS

The Latest Development in AUTOMATIC



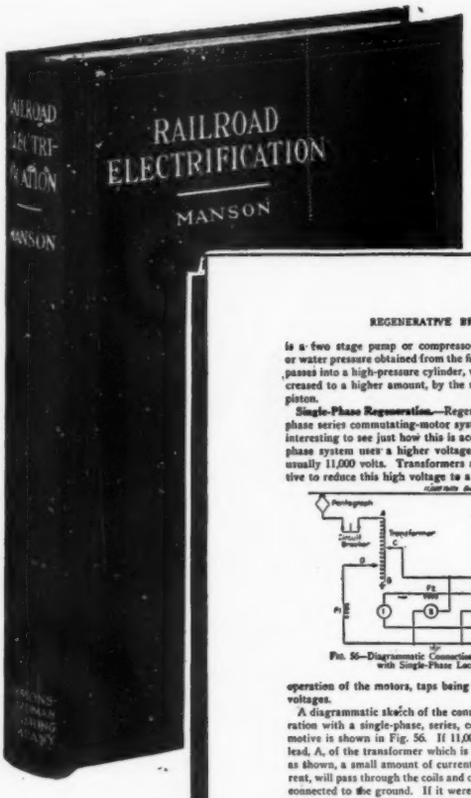
"AB" Type Empty and Load Brakes . . .

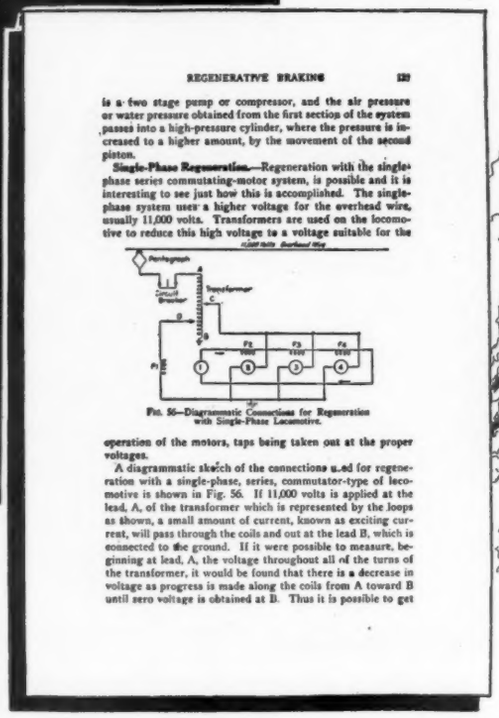
OUR latest development in equipment for the modern freight car having a high ratio of loaded to empty weight is the "AB" type Empty and Load Brake, which has a distinctive AUTOMATIC feature . . . A "strut cylinder" is mounted on a spring-supported member of the truck, and a piston stop attached to a non-spring-supported member . . . The allowable piston movement thus varies with the spring deflection as the car weight changes—which determines whether the equipment is set for empty or load operation . . . This mechanism is simple and accessible.

WESTINGHOUSE AIR BRAKE COMPANY

General Office and Works . . . . . WILMERDING, PENNA.

Railroad Electrification and the Electric Locomotive





REGENERATIVE BRAKING 329

is a two stage pump or compressor, and the air pressure or water pressure obtained from the first section of the system passes into a high-pressure cylinder, where the pressure is increased to a higher amount, by the movement of the second piston.

Single-Phase Regeneration.—Regeneration with the single-phase series commutating-motor system, is possible and it is interesting to see just how this is accomplished. The single-phase system uses a higher voltage for the overhead wire, usually 11,000 volts. Transformers are used on the locomotive to reduce this high voltage to a voltage suitable for the

FIG. 56—Diagrammatic Connections for Regeneration with Single-Phase Locomotive.

operation of the motors, taps being taken out at the proper voltages.

A diagrammatic sketch of the connections used for regeneration with a single-phase, series, commutator-type of locomotive is shown in Fig. 56. If 11,000 volts is applied at the lead, A, of the transformer which is represented by the loops as shown, a small amount of current, known as exciting current, will pass through the coils and out at the lead B, which is connected to the ground. If it were possible to measure, beginning at lead, A, the voltage throughout all of the turns of the transformer, it would be found that there is a decrease in voltage as progress is made along the coils from A toward B until zero voltage is obtained at B. Thus it is possible to get

2nd Edition.
332 pages.
148 illustrations
cloth, 6 x 9.
$3.00

Electrification has been proceeding slowly in spite of the depression. Because of greater horsepower and more serviceability hours a day, one electric is the equivalent of two steam locomotives.

While few roads are at present in a position to make large capital expenditures required for new electrification projects, there is no retrogression in this field. Expansion of electrification continues.

This book covers the theory, design, construction, care and operation of electric locomotives, and their application to all classes of railroad service. It is written by an authority in untechnical language. It is sound enough for the expert yet can be understood by the man who has only a general knowledge of the subject. A set of solutions to typical problems met with in electrification plans is included.

By Arthur J. Manson

Assistant Sales Manager, Transportation Department, Westinghouse Electric & Manufacturing Company

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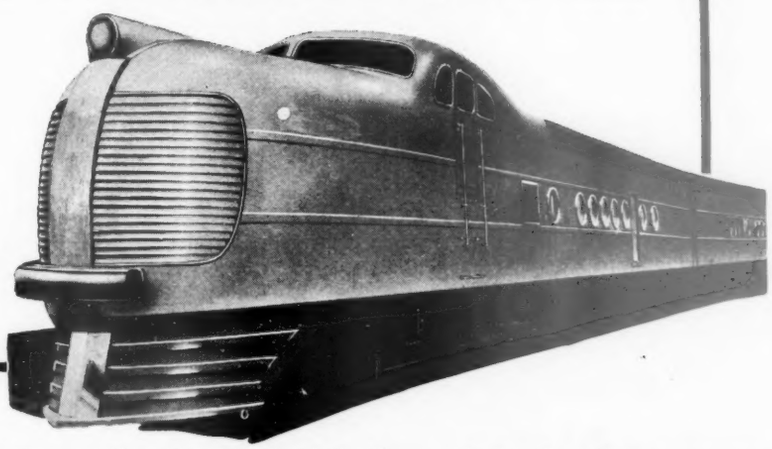

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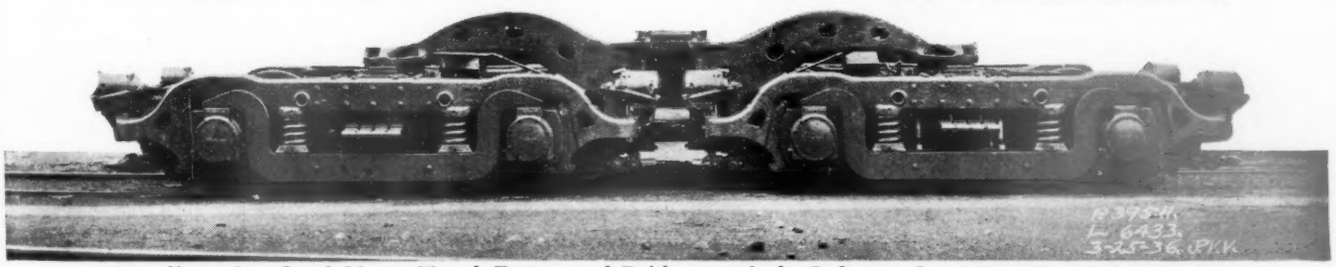

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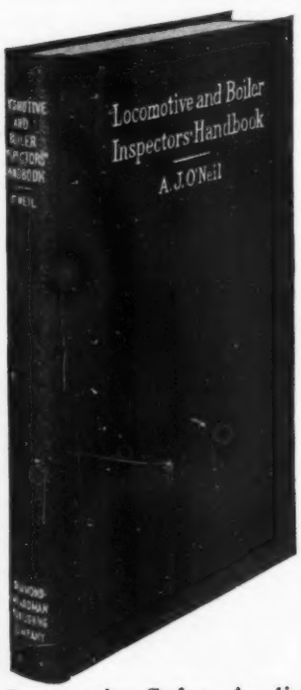

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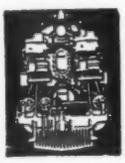

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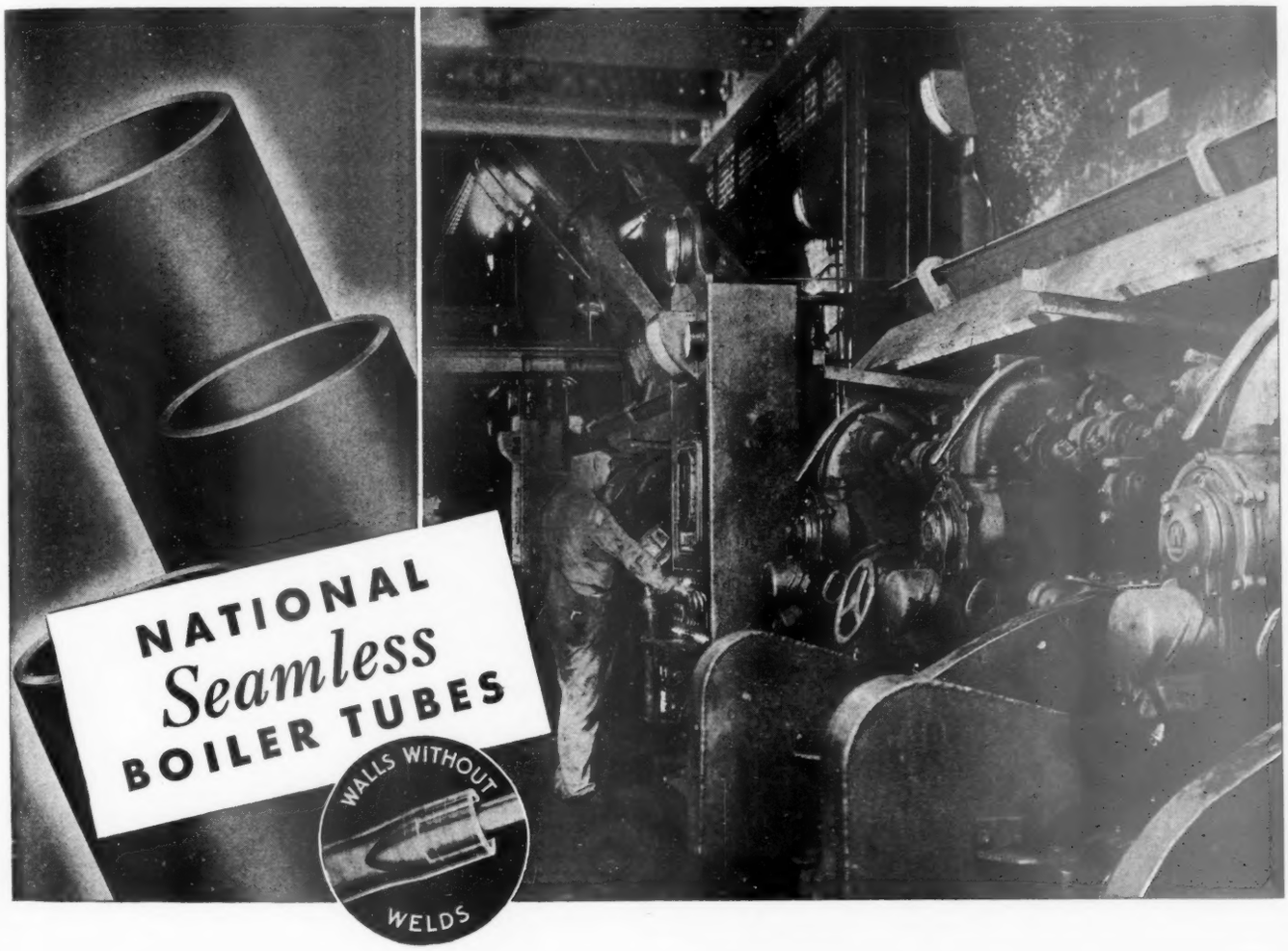

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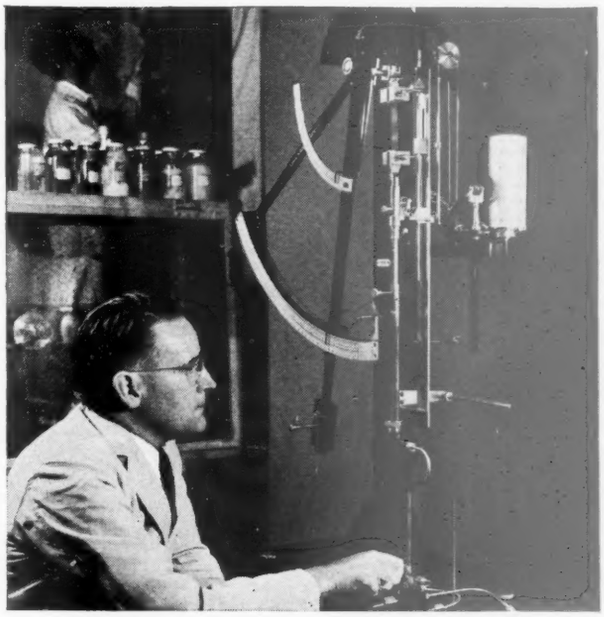

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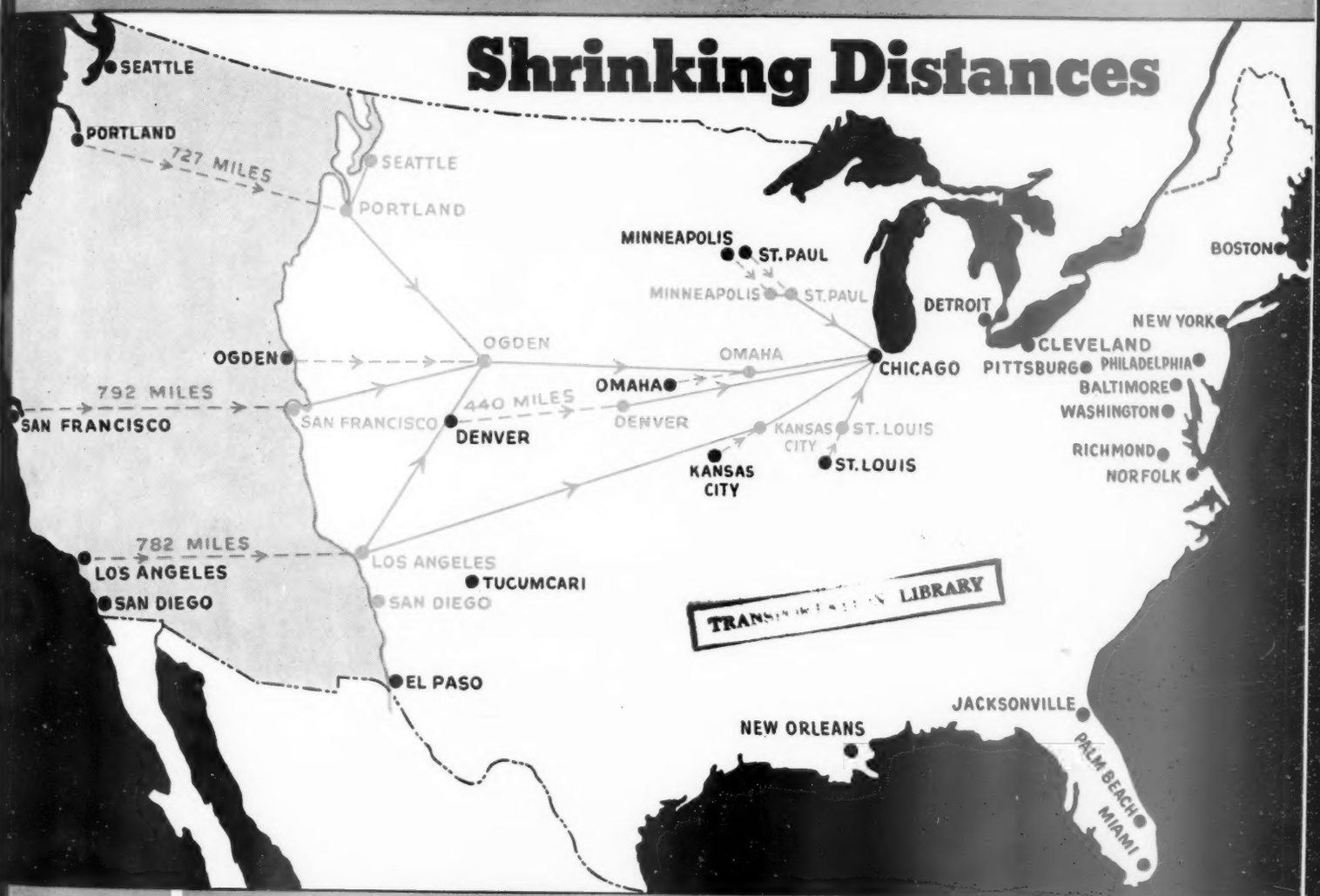

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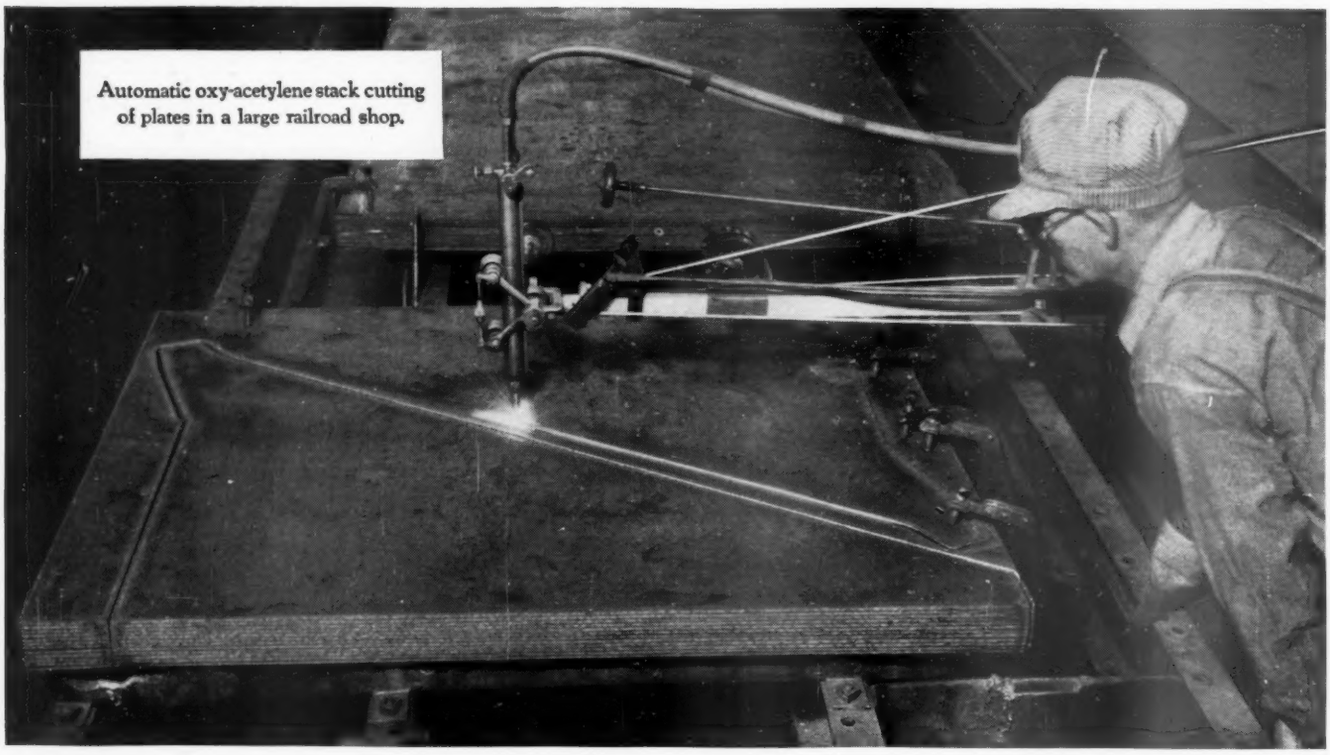

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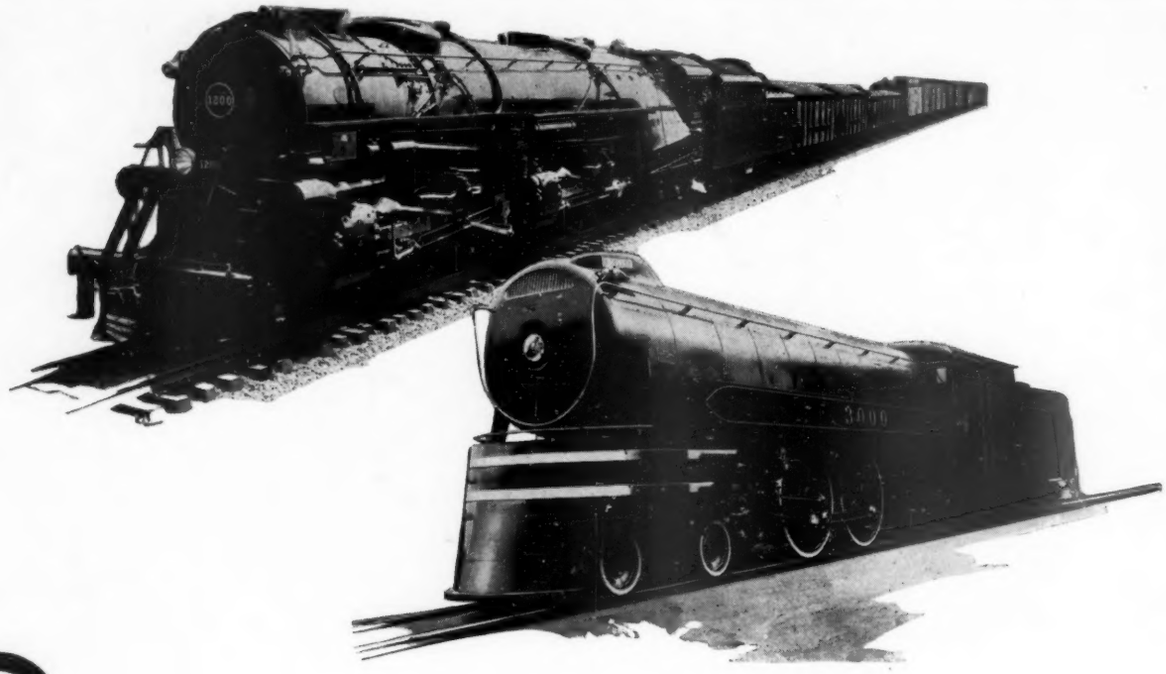

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